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COPY

Independent Forest Audit

Lake Nipigon Forest
2001-2006

klbm
FORESTRY CONSULTANTS INC.

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ON THE COVER Eggs of the Lesser Yellowlegs [*Tringa flavipes*] in a nest in a harvested area on the Lake Nipigon Forest.

1.0 Executive Summary ..... **v**

2.0 Introduction **1**

2.1 Audit Process **1**

2.1.1 Purpose 1
2.1.2 Audit Process Overview 1
2.1.3 The Audit Team 4
2.1.4 Guiding Principles 5

2.2 Forest Management Context **5**

2.2.1 Location of the Lake Nipigon Forest 5
2.2.2 Lake Nipigon Forest Overview 5
2.2.3 Issues Impacting Forest Management 7

3.0 Summary of Audit Findings **9**

3.1 Commitment **9**

3.2 Public Participation **10**

3.2.1 Local Citizens Committee 10
3.2.2 FMP Standard Public Consultation Process 11
3.2.3 Native Peoples Consultation 11
3.2.4 Annual Work Schedule Public Inspection 13

3.3 Forest Management Planning **14**

3.3.1 Planning Team Activities 14
3.3.2 Resource Stewardship Agreements 16
3.3.3 Sources of Direction 17
3.3.4 Introduction 17
3.3.5 Management Unit Description 17
3.3.6 Objectives and Strategies/Management Alternatives 20
3.3.7 Operational Planning 21
3.3.8 Plan Review, Approval 25
3.3.9 Plan Amendments 26
3.3.10 Contingency Plans 28
3.3.11 Annual Work Schedules 28

3.4 Plan Implementation **29**

3.4.1 Areas of Concern 29
3.4.2 Harvest 29
3.4.3 Renewal, 3.4.4 Tending and Protection, 3.4.5 Renewal Support 33
3.4.6 Access 37

3.5 Systems Support **39**

3.5.1 Human Resources 39
3.5.2 Documentation and Quality Control 40

3.6 Monitoring **41**

3.6.1 General Monitoring 41
3.6.2 Annual Report 45
3.6.3 Report of Past Forest Operations 45

3.7 Achievement of Management Objectives and Forest Sustainability **46**

3.7.1 Achievement of Management Objectives 46
3.7.2 Review of RPFO Assessment of Sustainability 52
3.7.3 Review of the Lake Nipigon Forest Comparison and Trend Analysis of Planned vs. Actual Forest Operations 54
3.7.4 Achievement of Forest Sustainability 58

3.8 Contractual Obligations **60**

4.0 Summary of Conclusions and Recommendations **74**

LIST OF APPENDICES

Appendix A: Comparison and Trend Analysis of Planned vs. Actual Forest Operations Report A-1
Appendix B: Audit Team Members and Qualifications B-1
Appendix C: Independent Forest Audit Guiding Principles C-1
Appendix D: List of Acronyms D-1
Appendix E: Summary of Input to Audit Process E-1
Appendix F: Public Survey F-1
Appendix G: Public Notification G-1

LIST OF TABLES

Table 1. Audit sampling intensity for the Lake Nipigon Forest (including salvage). 4
Table 2. Nipigon East Area LCC representation. 10
Table 3. Summary of alterations for the 2006-2011 Lake Nipigon Forest FMP. 25
Table 4. Summary of amendments by year and average approval time for the Lake Nipigon Forest. 27
Table 5. Summary of projected versus actual harvest area by forest unit, for the Lake Nipigon Forest during the 2001-2005 four-year term. 30
Table 6. Lake Nipigon Forest Compliance Report Summary (2001-2005). 42
Table 7. Summary of the status of the 1996-2001 Lake Nipigon Forest Timber Management Plan management objectives. 47
Table 8. Summary of the status of the 1997-2002 Auden Forest Timber Management Plan management objectives. 48
Table 9. Summary of the status of the 2001-2006 Lake Nipigon Forest FMP management objectives. 49
Table 10. Planned versus actual forest management activities for the three last planning periods on the Lake Nipigon Forest. 56
Table 11. Average yield in m^3/ha over three planning periods on the Lake Nipigon Forest. 56
Table 12. Analysis of area available for FTG incorporating the assumption of an equal annual harvest throughout the 15-year period. 57
Table 13. Summary of assessment of forest sustainability. 59
Table 14. Appendix E Wood Supply Commitments and level of achievement for conifer (spruce, pine and fir-SPF) for the Lake Nipigon Forest (2001-2006). 60
Table 15. Appendix E Wood Supply Commitments and level of achievement for hardwood for the Lake Nipigon Forest (2001-2006). 61
Table 16. Completion status of the 2001 Independent Forest Audit recommendations. 65
Table 17. Participation of Aboriginal peoples in forest management activities on the Armstrong and Lake Nipigon Forests for the 2001-2006 term. 71
Table 18. Summary of recommendations, suggestions and best practices by responsible party. 78
Table 19. Summary of recommendations, suggestions and best practices. 78

LIST OF FIGURES

Figure 1. Audit field site locations on the Lake Nipigon Forest. 3
Figure 2. Location of the Lake Nipigon Forest within the MNR Northwest Region of Ontario. 6
Figure 3. Summary of the Lake Nipigon Forest by working group. 7
Figure 4. A moose aquatic feeding area (MAFA) on the Lake Nipigon Forest. 19
Figure 5. Lake Nipigon Forest amendment frequency by year for the 2001-2006 term. 27
Figure 6. Mosaic of new and older harvest areas. 30
Figure 7. Example of poor tree retention. 31
Figure 8. Examples of wasteful practices and/or stranded wood. 32
Figure 9. Example of poor slash management. 33
Figure 10. Examples of good CLAAG in Block 901 *(left)* and Block 200 *(right)*. 33
Figure 11. Atigogama jack pine testing site. 34
Figure 12. Healthy planted black spruce stock. 35
Figure 13. Block 901 CLAAG area with very little advance growth. 36

Figure 14. *Left* White birch competing with planted black spruce seedling following spray on Block 810. *Right* Block 110, note the green vegetation on the left side of the photograph compared to the right side....36
Figure 15. Aggregate pits that need decommissioning work on the Lake Nipigon Forest. 38
Figure 16. Blair Lake Road: note the entire right of way had to be utilized to build the road bed due to the shallow site with little soil above bedrock....39
Figure 17. Free-to-grow area in Block 150. 43
Figure 18. Caribou tracks at field site 10....47
Figure 19. Current and assumed historic age-class distribution on the Lake Nipigon Forest. 53
Figure 20. Successful FTG area and desired forest unit viewed in Block 150....73

1.0 Executive Summary

This audit report, for the Lake Nipigon Forest (the Forest), is the result of an Independent Forest Audit (IFA) conducted by KBM Forestry Consultants Inc., under contract to the Ontario Ministry of Natural Resources (MNR). All Crown forests in Ontario must undergo an IFA at least every five years; the requirement for independent audits arising from MNR's Class Environmental Assessment Approval for Forest Management on Crown Lands in Ontario (2003). Regulation 160/04 of the Crown Forest Sustainability Act sets out the specific requirements for conducting the audits.

The Lake Nipigon Forest is located in MNR's Northwest Region within the Nipigon District. The audit covers the implementation of the 2001-2006 Forest Management Plan (FMP) and the public participation, planning and preparation of the 2006-2011 FMP. The Lake Nipigon Forest is managed under Sustainable Forest Licence (SFL) number 550412 held by Norampac Inc. (Norampac). Norampac is jointly owned by Domtar Inc. (Domtar) and Cascades Inc. Although Domtar manages the Forest under contract with Norampac, it is Norampac that is responsible for the SFL and therefore the audit findings are directed to Norampac.

The principal auditees are Norampac and the Ministry of Natural Resources Nipigon District (MNR). Other auditees include Overlapping Licensees, contractors and other branches of MNR to the extent that forest management activities carried out by them are the subject of audit examination.

The purpose of the IFA is to:

- Assess compliance with the Forest Management Planning Manual (FMPM) and the Crown Forest Sustainability Act (CFSA);
- Assess compliance of forest activities with the FMPM and the CFSA;
- Compare planned versus actual forest management activities;
- Assess the effectiveness of forest management activities in achieving audit criteria and management objectives;
- Assess the effectiveness of any action plans resulting from previous audits; and
- Assess a licensee's compliance with the terms and conditions of the SFL.

Based on the audit, 27 audit Recommendations were made. Recommendations can arise from audit team observations of material non-conformances, or may be developed to address situations in which the audit team identifies a significant lack of effectiveness in forest management activities.

Eleven of the recommendations are directed to MNR, six are given to Norampac and ten address actions required by both MNR and Norampac. Eighteen suggestions are given, of which the majority (11) are directed to Norampac. Suggestions are less serious in nature and provide advice for improving particular aspects of forest management.

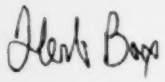
In the opinion of the audit team, one of the key findings of the audit is the achievement by all parties in identifying, attaining and maintaining a more equal participation by Aboriginal communities in the benefits derived from the Lake Nipigon Forest. This received a Best Practice.

Nine of the 11 recommendations directed to MNR, three of the six recommendations given to Norampac and six of the ten recommendations directed to both Norampac and MNR, address deficiencies in planning and process rather than implementation. This reflects the character of many of the protocols in the IFAPP. Norampac has to continue efforts to improve field practices with respect to utilization, compliance and slash management, complete the forecasted free-to-grow assessments and the MNR has to determine if sufficient resources are being provided to meet its obligations.

The audit team notes as is common in other boreal forests, the level of harvest is forecast to decline for the next 30 years, due to an "age-class gap". Furthermore, the forecasted harvest yields and levels are

dependent on a strong hardwood market. The impact of this decline is a concern expressed by the auditees, the Local Citizen's Committee and Aboriginal communities that will need to be addressed in future plans.

The audit team concludes that, with the exceptions noted in the audit report, management of the Lake Nipigon Forest was in compliance with the legislation, regulations and policies that were in effect during the term of the audit, and the Lake Nipigon Forest was managed in compliance with the terms of Sustainable Forest Licence Number 550412 held by Norampac Inc. Although timber volumes and other values, such as wildlife habitat, will fluctuate over time, forest sustainability is being achieved as assessed through the Independent Forest Audit Process and Protocol.



Herb Bax, R.P.F., CF/CFA, CEA (SFM), EMS (LA)
Lead Auditor, on behalf of the Audit Team

2.0 Introduction

This audit report presents the results of the Independent Forest Audit (IFA) conducted by KBM Forestry Consultants Inc. (KBM) on the Lake Nipigon Forest (the Forest) for the five-year period from April 1, 2001 to March 31, 2006. The audit covers the implementation of the 2001-2006 Forest Management Plan (FMP) and the public participation, planning and preparation of the 2006-2011 FMP. The Lake Nipigon Forest is managed under Sustainable Forest Licence (SFL) number 550412, held by Norampac Inc. (Norampac). Norampac is jointly owned by Domtar Inc. (Domtar) (50%) and Cascades Inc. (50%). Although Domtar manages the Forest under contract with Norampac, it is Norampac that is responsible for the SFL and therefore the audit findings are directed to Norampac. Throughout this audit report any reference to 'the Company' refers to Norampac.

The principal auditees are Norampac and the Ministry of Natural Resources Nipigon District (MNR). Other auditees include Overlapping Licensees, contractors and other branches of MNR to the extent that forest management activities carried out by them are the subject of audit examination.

2.1 Audit Process

2.1.1 Purpose

The Independent Forest Audit Process and Protocol[1] (IFAPP) was developed by the Ministry of Natural Resources Forest Management Branch to provide a comprehensive and consistent method of evaluating forest management activities on Crown land. The IFAPP states that the purpose of an Independent Forest Audit is to:

- Assess to what extent forest management planning activities comply with either the 1996 Forest Management Planning Manual[2] (FMPM) or the 2004 FMPM[3] and the Crown Forest Sustainability Act[4] (CFSA);
- Assess to what extent forest management activities comply with the CFSA and with the forest management plan(s), the manuals approved under the CFSA and the applicable guides;
- Compare planned versus actual forest management activities;
- Assess the effectiveness of forest management activities in meeting forest management objectives set out in the forest management plan, as measured in relation to the criteria established for the audit;
- Assess the effectiveness of any action plans implemented to remedy shortcomings as identified by a previous audit; and
- Review and assess a licensee's compliance with the terms and conditions of the SFL.

2.1.2 Audit Process Overview

The IFAPP contains 152 criteria and 403 procedures, of which 330 apply to the Lake Nipigon Forest audit. The audit procedures serve as a framework to provide a structured approach to evaluating whether or not forest management activities meet the requirements governing forestry practices on Crown land in Ontario.

The previous IFA conducted on the Forest was undertaken in 2001[5]. The implementation of actions to address the recommendations contained in the previous audit was examined during the course of this audit (see Section 3.8).

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[1] MNR. 2006. Independent Forest Audit Process and Protocol. Copyright © Queens Printer. 26 pp. + Appendices.
[2] MNR. 1996. Forest Management Planning Manual for Ontario's Crown Forests. Queen's Printer for Ontario. 452 pp.
[3] MNR. June 2004. Forest Management Planning Manual for Ontario's Crown Forests. Toronto: Queen's Printer for Ontario. 440 pp.
[4] Crown Forest Sustainability Act, 1994, S.O. 1994 c. 25.
[5] Callaghan & Associates Inc. 2002. An Independent Audit of Forest Management on the Lake Nipigon and Auden Forests for the Period 1996 to 2001. 66 pp. + Appendices.

The audit process for the Forest consisted of six components:

1. Audit Plan[6]: KBM prepared an audit plan that described the schedule of audit activities, audit team members and participants, and auditing methods. The plan was submitted to MNR, Norampac, the Forestry Futures Committee (FFC), and the Chair of the Nipigon East Area Local Citizens Committee (LCC).

2. Public Survey: KBM prepared a one-page public survey that was distributed to all organizations and to a random sample of one-third of the individuals listed in the 2006-2011 Lake Nipigon Forest FMP mailing list provided by MNR. This included Overlapping Licensees, contractors, commitment holders, tourist operators, Aboriginal community representatives and members of the LCC. The public survey was also mailed to individuals who were members of the LCC at some time during the audit period but are not current members. In addition, the public survey was posted on and available for download from KBM's web site (www.kbm.on.ca). The purpose of the survey was to solicit public input and to provide respondents with an opportunity to identify and discuss any site-specific concerns on the Forest. A copy of the survey is provided in Appendix F.

   Thirty-one responses were received as a result of the KBM public survey mail-out. A summary is presented in Appendix E.

   Notices were placed in five local newspapers (the *Wawatay News*, the Thunder Bay *Chronicle Journal*, the *Thunder Bay's Source*, the *Nipigon Red Rock Gazette*, and the *Geraldton Times Star*), soliciting public input on forest management activities on the Forest for the period under audit. A copy of the public notification can be found in Appendix G.

3. Field Site Selection: The audit team carried out a preliminary site selection prior to meeting with Norampac and MNR staff. Annual Work Schedules (AWSs) and Annual Reports (ARs) were used to ascertain the amount and type of forest operations carried out on the Forest during the course of the audit term. A stratified random sample of sites was then selected to ensure that selected sites were representative of activities conducted on the Forest during the audit term. A pre-audit meeting was held in Red Rock on April 25 and April 26, 2006. Much of the pre-audit was spent with Norampac and MNR, conducting the preliminary site selection for the field portion of the audit.

4. Pre-audit Document Review: Prior to the site visit, the audit team reviewed documents provided by Norampac and MNR including, but not limited to, the:
   - 2001-2006 Lake Nipigon Forest FMP,
   - 2006-2011 Lake Nipigon Forest FMP,
   - 1991-1996 Report of Past Forest Operations (RPFO) for the Lake Nipigon Forest,
   - 1996-2001 RPFO for the Lake Nipigon Forest,
   - 2001-2005 ARs,
   - 2001-2006 AWSs,
   - Comparison and Trend Analysis of Planned versus Actual Forest Operations Report (Trend Analysis Report),
   - 1996-2001 IFA Report for the Lake Nipigon Forest,
   - Lake Nipigon and Auden Forests 1996-2001 IFA Action Plan, and
   - Lake Nipigon and Auden Forests 1996-2001 IFA Action Plan Status Report.

5. On-Site Audit: The audit team spent nine days on site conducting the office and field portions of the audit from June 19 to June 27, 2006. The audit team conducted interviews with staff from Norampac, MNR Nipigon District, MNR Northwest Region, MNR Finance and Business Services Branch, the Centre for Northern Forest Ecosystem Research, Overlapping Licensees, wood supply commitment holders and Aboriginal community representatives. The audit team also conducted interviews with

[6] KBM Forestry Consultants Inc. 2006. Armstrong and Lake Nipigon Forests Independent Forest Audit Audit Plan. 20 pp. + Appendices.

LCC members at an evening meeting with the Nipigon East Area LCC on April 25, 2006 and, in some cases, individually. The audit team examined documents, records, and maps at Norampac and MNR offices, and spent two days in the field examining forestry practices at 27 field sites (Figure 1). Norampac, MNR, Overlapping Licensees, FFC, LCC and Aboriginal community representatives accompanied the audit team in the field to examine the field sites.

KBM committed to a sampling range of between 10 and 25 % of key activities and operations conducted on the Forest. Table 1 presents the sampling intensity of the field visits completed on the

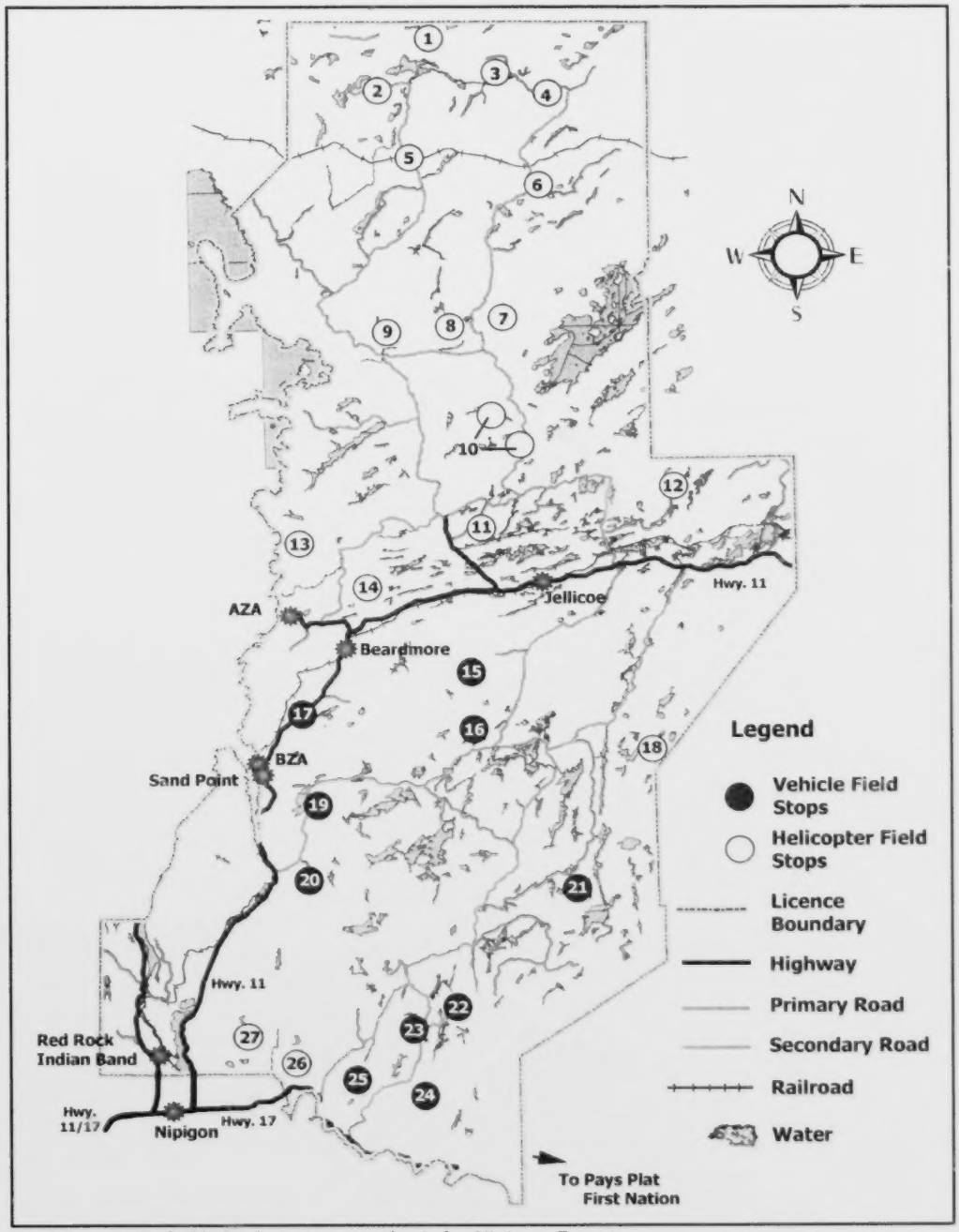

Figure 1. Audit field site locations on the Lake Nipigon Forest.

Forest. The objectives of the field site visits were to confirm that on-the-ground activities were conducted according to the FMP, conformed to provincial laws, regulations, and guidelines, and were effective. A sample of all key forest management activities was examined on the ground. The audit team relied on a helicopter to reach a number of the field sites to gain a better overview of forest management activities, to deal with access constraints and to enable a more efficient audit.

A closing meeting was held in Red Rock on June 27, 2006. The meeting provided a forum for the audit team to present and discuss preliminary audit results with Norampac, MNR, Overlapping Licensees, FFC and LCC representatives.

6. Final Report: The audit results are presented in conjunction with a brief description of the audit process and the forest licence area under review. Within the report, the audit team makes recommendations and suggestions aimed at improving forest management. An important distinction is made between Recommendations and Suggestions. Recommendations draw attention to deficiencies in forest management that require corrective action. In most cases, Recommendations are a result of non-conformance to a law and/or policy, or specify a lack of effectiveness in forest management activities. Recommendations arising from this audit must be addressed in an action plan developed by Norampac in consultation with the District Manager and designated Regional and Forest Management Branch representatives of the MNR, as per Appendix E of the IFAPP. Suggestions are less serious in nature and provide advice for improving particular aspects of forest management. The auditees are not required to address Suggestions in the Action Plan. In addition, the audit team may highlight exceptional management practices or high level of performance noted on the Forest through a Best Practice.

Table 1. Audit sampling intensity for the Lake Nipigon Forest (including salvage).

Activity	Total Area/Number (2001-2006)[a]	Area/Number Sampled	Percent Sampled (%)
Harvest (ha)	37,437	8,209	22
Renewal (ha)	43,094	11,564	27
Tending (ha)	9,915	1,112	11
Free-to-Grow (ha)	3,122	807	26
Areas of Concern Categories (#) General Categories[b] Specific Areas of Concern[c]	 10 30	 8 6	 80 20
Road Construction (km)	67	27	40
Road Maintenance (km)	2827	312	11
Specified Procedures Review [d] (ha)	6,684	2,125	32

[a] Harvest, renewal and tending area is estimated based on four years actual and one year projected.
[b] The 2001-2006 FMP created ten general categories of Areas of Concern (AOC) to encompass different types of AOCs present on the Lake Nipigon Forest with similar prescriptions. Examples include fisheries/water quality, stick nests, and tourism/recreation.
[c] The 2001-2006 FMP also created 30 specific AOCs such as AOC-110-3 Trappers Cabin North of Horsetail Lake.
[d] The Specified Procedures Review involved the verification of maps, records, and fieldwork associated with Forest Renewal Trust Account expenditures for 2004-2005.

2.1.3 The Audit Team

The audit was conducted by an independent audit team assembled by KBM under contract with MNR. The audit team consisted of eight members:

- Herb Bax, R.P.F., CF/CFA, CEA (SFM), EMS (LA) - Lead Auditor

- Dave West, R.P.F. - Planning Auditor
- Laird Van Damme, R.P.F. - Harvest Operations Auditor
- Peter Higgelke, R.P.F. - Wildlife/Ecology Auditor
- Brad Chaulk, R.P.F. - Silviculture Auditor
- Keith Hautala, M.Sc.F. - Forest Modeling (SFMM) Auditor
- Mary Ann Seabrook - First Nations Auditor
- Terri Dawyd - Audit Secretariat

Audit team members and their responsibilities are described in Appendix B.

2.1.4 Guiding Principles

The IFAPP identifies the components of the audit process. The audit protocol consists of principles, criteria, and procedures. The eight guiding principles are described in Appendix C. Each principle contains a series of criteria that guide the audit team during its assessment of the achievement of the principles. For each criterion a number of procedures serve to assess the auditees' compliance and effectiveness. KBM assigned each of the applicable procedures to an auditor who in turn examined the evidence for conformity to the procedure.

2.2 Forest Management Context

2.2.1 Location of the Lake Nipigon Forest

The Lake Nipigon Forest is located within the Nipigon District of MNR's Northwest Region and lies along the eastern shores of Lake Nipigon, south to Lake Superior (Figure 2). There are a number of communities and First Nations situated within the boundaries of the Forest who are impacted by activities on the Forest, including Beardmore, Jellicoe, Sand Point First Nation, Animbiigoo Zaagi'igan Anishinaabek (Lake Nipigon Ojibway), Biinjitiwaabik Zaaging Anishinaabek (Rocky Bay First Nation) and Red Rock Indian Band.

There are many other communities and First Nations in the surrounding area, not specifically mentioned above, that are also influenced by activities occurring on the Lake Nipigon Forest.

2.2.2 Lake Nipigon Forest Overview

Logging history in the southern two thirds of the Lake Nipigon Forest began in 1926 with the formation of the Nipigon Corporation, although major logging operations were not initiated until 1937 when Lake Sulphite Pulp Co. built a 40-man camp at McKirdy Siding. Prior to this time, only small amounts of wood were periodically extracted from the Forest. Logging under Brompton Pulp and Paper began in 1942, to correspond with the initial start-up of the Nipigon groundwood mill. In 1952, the St. Lawrence Corporation took over Brompton Pulp and Paper. The cutting rights of the St. Lawrence Corporation were transferred to Domtar in 1978.

The early logging camps were situated along major waterways capable of being log-driven and were in close proximity to the Nipigon mill. The major logging areas included Purdom, Booth and Ledger Townships, the Beardmore area along the Blackwater River, along the Lake Nipigon Shoreline and along the Jackfish River. As the truck haul began to gain more importance in the late 1960s, camps moved off the major waterways. The direct haul to the Red Rock mill began in the fall of 1971 after a period in which wood was hauled to landings along rivers for driving. The last river drive was in 1972 and the last raft of timber reached the Red Rock mill in 1973.

In 1997, Domtar merged its packaging assets with those of Cascade Inc. to create Norampac. As a result of this merger, Domtar secured part ownership of Norampac and continued to manage the Lake Nipigon Forest through an agreement with Norampac. In 2000, the MNR amalgamated a number of former management units (and portions of others) with the Lake Nipigon Forest. These former management units included the Auden Forest, the Onaman Crown Management Unit, the Gravel River portion of the Steel River Management Unit, the Orient Bay Peninsula and the Kitto and Kilkenny Township portion of

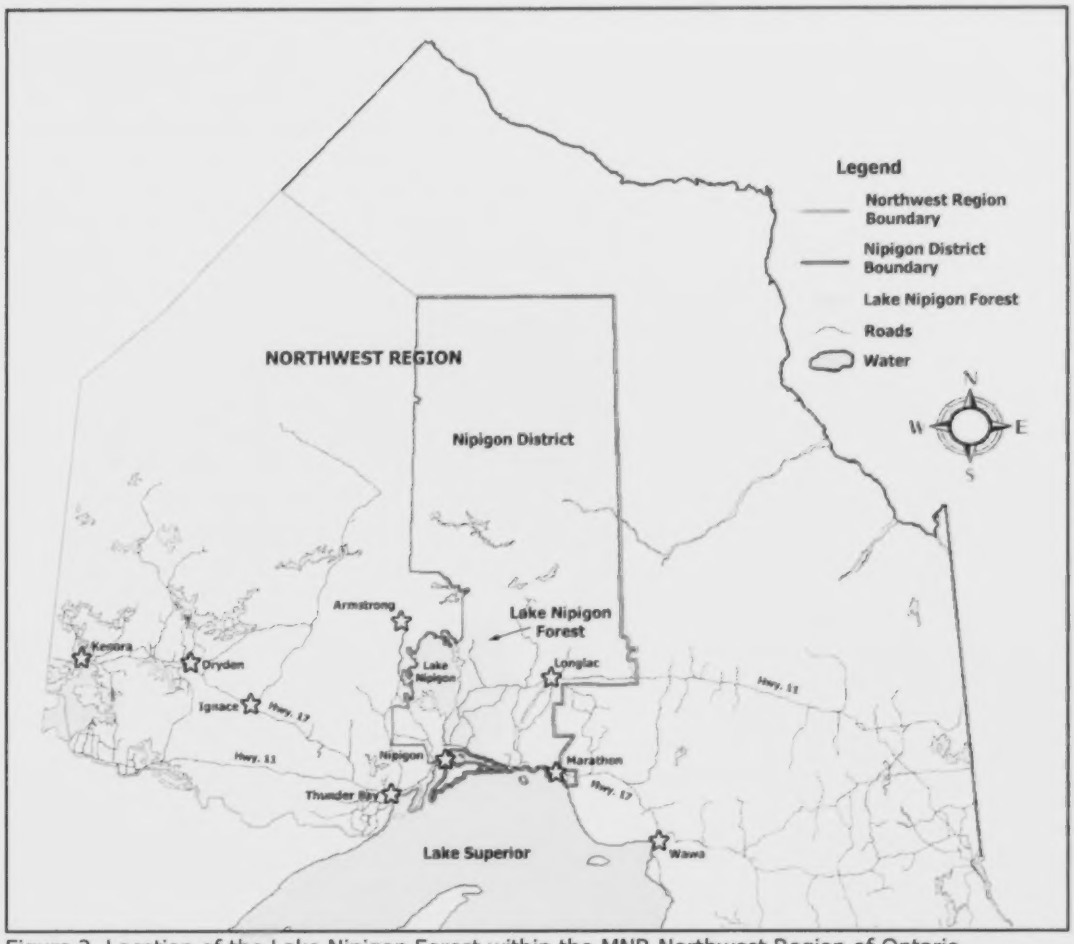

Figure 2. Location of the Lake Nipigon Forest within the MNR Northwest Region of Ontario.

the Nipigon Crown Management Unit. The amalgamated management unit now comprises the Lake Nipigon Forest.

The Lake Nipigon Forest supplies Norampac's linerboard mill in Red Rock with mill furnish primarily through a fibre exchange agreement between Domtar, Great West Timber Ltd. (Great West Timber), Northern Sawmills Inc. (Northern Sawmills), and the Domtar Inc. White River sawmill (Domtar-White River). Approximately two-thirds of the softwood from the Lake Nipigon Forest is committed to Great West Timber and Northern Sawmills in accordance with Appendix E of the SFL. The remaining one-third of softwood from the Forest is committed to the Domtar-White River mill, either directly or through exchange agreements. Actual wood flow during the audit period was considerably different including a significant amount of direct bush chip flow to Norampac's 400,000 metric tonne kraft linerboard mill in Red Rock (see Section 3.8 and Table 14 and Table 15). This mill employs approximately 420 people and is the major employer for the people of Red Rock, Nipigon and surrounding communities. Great West Timber's random length sawmill in Thunder Bay currently produces 200,000,000 fbm annually and employs 406 people from Thunder Bay and the surrounding area. The Domtar-White River sawmill currently produces 125,000,000 fbm annually and employs approximately 300 people.

The First Nation communities of Red Rock Indian Band, Biinjitiwaabik Zaaging Anishinaabek and Animbiigoo Zaagi'igan Anishinaabek also currently hold Forest Resource Licenses (FRLs) to harvest conifer and hardwood from the Lake Nipigon Forest. These operations are to supplement the

Buchanan Forest Products Ltd. (BFPL) operation in supplying sawlog material to Great West Timber and subsequently Norampac through fibre exchange, as well as supplementing the Domtar-White River operation to supply sawlog material to the White River sawmill and subsequently Norampac through fibre exchange. During the audit period, the First Nation operations provided a small portion of the commitment to the Buchanan mills and Domtar-White River mill. The majority of the harvest by the First Nation operations was bush chipped, with the softwood portion going directly to Norampac Inc., Red Rock.

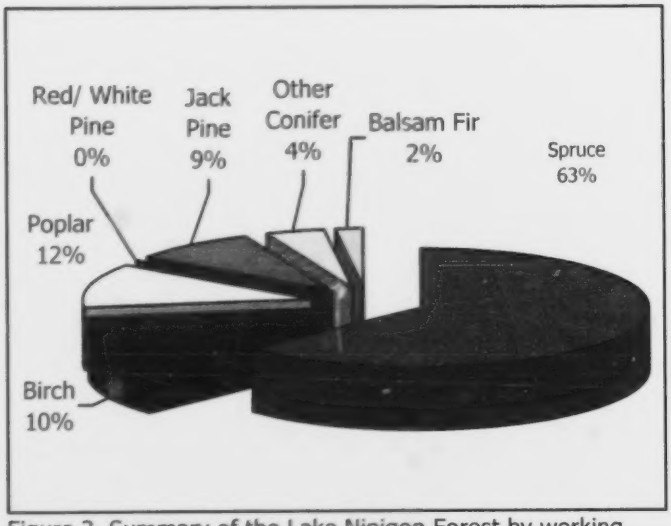

Figure 3. Summary of the Lake Nipigon Forest by working group.

The Lake Nipigon Forest lies predominantly within the Boreal forest (the inter-lake portion falls partially into the Great Lakes - St. Lawrence forest) and comprises a total area of approximately 990,000 ha, of which 900,000 ha, or approximately 91%, is Crown-managed production forest. The tree species composition is typical for the Boreal forest and is predominantly spruce, pine, and poplar with lesser amounts of birch, balsam fir, cedar, larch, red pine, and white pine, as shown in Figure 3. The Forest landscape is influenced by large natural disturbances including wildfire, blowdown, and insect predation. A discussion, and Figure 19 depicting the age-class distribution of the Forest, is included in Section 3.7.

2.2.3 Issues Impacting Forest Management

The IFAPP requires a review of high priority aspects (HPAs) of the auditees' systems or activities before the site visit takes place. HPAs can include significant management challenges that are inherent to the forest (e.g. presence of woodland caribou or extensive areas of sensitive soils), or can be specific issues that have arisen during forest management planning or plan implementation (e.g., conflicts with other forest users over proposed forest management activities).

Representatives of both auditees (Norampac and the Nipigon District MNR) were contacted. Based on these discussions, the list below identifies those areas that, in the opinion of the auditors, are HPAs. The list is not meant to be exhaustive, nor is it meant to duplicate what the IFAPP and/or FMP already have identified (e.g. actual versus planned activities, First Nation consultation and participation, etc.). It is primarily derived from a review of the issues with the auditees. The sections in the audit report where the HPAs are addressed are indicated in parentheses.

1. The ability of the forest industry (commitment holders on the SFL) to deal with short- and predicted medium-term fibre supply reductions in both softwood and hardwood, due to the current age-class imbalance of the forest (Figure 19), as well as spatial planning issues such as implementation of the Forest Management Guide for Natural Disturbance Pattern Emulation[7] (NDPEG), marten cores, woodland caribou mosaic, and protection of remote tourism values. These issues continue to impact negatively on Available Harvest Area (AHA) (level and composition), the ability to allocate the AHA in a manner that allows for cost efficient and effective operations (block size, location, proximity to all weather access etc.) as well as other forest resources and uses. It appears that the demand for a wide variety and sometimes

[7] MNR. 2001. Forest Management Guide for Natural Disturbance Pattern Emulation. Queen's Printer for Ontario. 24 pp. + Appendices.

competing, and increasing amount of benefits from a finite resource base is reaching the point where not all the needs can be fully met (Sections 3.7.1, 3.7.3, and 3.8).

2. Woodland caribou - lack of caribou habitat and caribou presence data (e.g. the caribou mosaic approach in the Lamaune Lake area) and coordination with adjacent management units (Section 3.3.7).
3. Socio-economic disposition of harvest depletion areas, and negotiation with First Nation communities and local communities regarding continuing forest management operations/opportunities (Section 3.3.5, 3.8).
4. The development of Groundwater Recharge Zone prescriptions (Section 3.3.7).
5. The road link between the Armstrong and Lake Nipigon Forests (Section 3.3.1).
6. Breakdown of free-to-grow (FTG) survey data relative to the entire forest land base and analysis of FTG surveys relative to the preferred prescription (Sections 3.3.7, 3.7.3 and 3.8).

3.0 Summary of Audit Findings

The results of the audit are presented below in relation to the eight principles within the audit protocol identified in Appendix C.

3.1 Commitment

Commitment is assessed in terms of the existence of vision, mission and policy statements of the organization. These statements provide long-term guidance and direction as to how the organization's goals will be achieved and must be reflected in the day-to-day operations of the organization. Norampac is a joint-venture company owned by Cascades Inc. (50%) and Domtar (50%). Norampac operates based on two fundamental values: a social conscience and respect of environmental resources. The company meets it social commitment through producing recyclable products; achieving environmental ISO accreditations, investing in research and providing donations to charitable groups and other socially responsible organizations.

As the company managing the daily activities on the Lake Nipigon Forest, Domtar's commitment to Sustainable Forest Management (SFM) is very relevant and also worth documenting. Domtar has modern vision and mission statements that communicate its long-term pledge to becoming a leader in "responsible, progressive and sustainable forest management". The overarching corporate policy statement *"A forest for all, for always"* effectively captures its commitment to sustainability. Domtar also has well-developed detailed policy documents underscoring its commitment to SFM, including a Forest Policy, an Environmental Policy, and a Fibre Use and Sourcing Policy. In addition to its commitment to SFM through the management of activities on the Forest, Domtar's policy documents also highlight its commitment to engaging public participation, working with First Nations, training and involving employees and contractors and reducing the use of pesticides.

Copies of the vision and mission statement and above-mentioned policies are posted at Domtar's woodlands office in Red Rock, are available on the corporate website and form part of the Environmental Management System (EMS) discussed next.

Domtar Inc.–Forest Products Group–Red Rock has an EMS which is currently certified to ISO 14001 and received the original registration in October of 2003. The creation of the comprehensive EMS program is the basis by which the Company ensures its commitment to SFM is reflected in the day-to-day activities. The EMS program is updated annually to remain current and is reviewed with staff and contractors working on the Forest each year.

Interviews with Company staff confirmed that they are familiar with and committed to the vision, mission and policy statements in place.

MNR Forest Division has a vision and mission statement addressing their commitment to SFM by "...providing balanced environmental, social and economic benefits now and for the future." All forest policies and management practices on Crown lands must conform to the Policy Framework for Sustainable Forests[8], which covers such matters as harvesting and regeneration, the management of old-growth forests and the protection and conservation of non-timber values. The goal, principles and objectives in this document capture MNR's commitment to SFM, which is entrenched in law in the CFSA. MNR is provided overall strategic direction in meeting its commitments to SFM through the following documents:

- The Statement of Environmental Values[9];
- The 2000 policy statement Beyond 2000[10]; and

[8] MNR. 1994. Policy Framework for Sustainable Forests. 5 pp.
[9] MNR. 1995. Statement of Environmental Values. 6 pp.
[10] MNR. 2000. Beyond 2000. 20 pp.

- The 2005 policy statement Our Sustainable Future[11] (released in February 2005 and therefore applicable to approximately the last year and two months of the audit period).

Discussion with MNR staff confirmed that they are familiar with and committed to the strategic direction guided by the vision and mission statements and documents listed above.

3.2 Public Participation

3.2.1 Local Citizens Committee

The Nipigon East Area LCC was established in 1995 and covers a large geographic area with a number of communities including two First Nation communities. The number of members is relatively large at 16 and most groups have designated alternates to ensure representation and attendance at meetings. This effective use of alternates means that all meetings were well attended.

The LCC reviewed and updated their membership status in late 2003 in anticipation of the start of the 2006-2011 FMP planning process. The Nipigon East Area LCC Omnibus Report[12] indicates that the Committee is awaiting nominations/appointments for vacancies. A review of LCC minutes and the Omnibus Report also indicated that letters of invitation were sent out to various interest groups in the area to fill identified vacancies with some success. Over the audit period there was a range and balance of interests on the Committee. Table 2 provides a summary of the range in member representation. While the list identifies a facilitator, this member has in practice become a regular member of the LCC.

Table 2. Nipigon East Area LCC representation.

2005 Nipigon East Area LCC	
Interest Group	**Representation**
Angler/Hunter	1
Forest Union	0
Tourism	2
Naturalist	1
Woodsworker	1
Independent Loggers	1
Chamber of Commerce	1
Aboriginal Community	2
Recreationalist	2
Mineral Sector	2
Forest Industry	3
Trappers	3
General Public	3
Municipalities	3
Local Business	4
MNR	2
Facilitator	1
Total*	**32**

*Total of 16 members plus alternates, with some representing more than one interest group.

The LCC met five to six times a year with more frequent meetings during the middle of FMP preparation. Attendance was good, with an average of over 65% and most members attended more than 60% of the meetings. From a review of meeting minutes and interviews with LCC members, meetings were well organized and generated well-documented action items. Registers are kept for both action items and recommendations. Both are reviewed as to progress at each meeting and updated, with additional items added as required.

The LCC Terms of Reference met all the requirements of the 1996 FMPM.

This LCC was very active in the development of the 2006-2011 FMP. The LCC nominated an individual to represent them on the planning team, as well as an alternate. These representatives attended all but one of the planning team meetings. All LCC members are listed on the FMP contributor's page and all FMP public notices included contact information for the LCC chairperson as required. A review of the LCC meeting minutes indicated that the LCC reviewed and discussed a draft objective summary and draft worksheet provided by the Company. The LCC also participated in the development and analysis of management alternatives and the values maps.

[11] MNR. 2005. Our Sustainable Future. 21 pp.

[12] Nipigon East Area LCC. 2005. Nipigon East Area LCC Omnibus Report from January 2001 to April 2005. 5 pp. + Appendices.

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It was evident by the quality of the LCC Omnibus Report that considerable time and effort went into the document. Efforts were made to ensure the LCC statement on the FMP contributor's page captured the Committee's position accurately.

In terms of annual involvement in FMP implementation, the LCC meeting minutes confirm that the LCC had the opportunity to inspect each AWS during the audit period as well as the aerial herbicide programs and prescribed burn plans. The LCC made recommendations with respect to amendments and tracked the progress of amendments until they were approved.

The LCC has done a good job of representing the diverse interests over a large geographic region. The LCC is interested and engaged in the forest management activities that are undertaken within this area and are well supported by the Company and the MNR staff in the Nipigon District. The audit team compliments the LCC on a job well done.

3.2.2 FMP Standard Public Consultation Process

Both the details and the time requirements of the 1996 FMPM were met in the issuance of all FMP public notices, with one exception. Forest management planning public consultation notices were not placed in local publications in the Aboriginal media, as required under the standard public consultation process in the 1996 FMPM. MNR staff indicated that discussions were held with the participating Aboriginal communities regarding the provision of forest management planning notices. It was agreed that direct notices to members of the community through the weekly household distribution or a direct mailing would suffice. The 2004 FMPM has modified the requirements for the involvement of Aboriginal communities in forest management planning, including the provision of notices to Aboriginal communities. The MNR is required to develop a consultation approach with each Aboriginal community in or adjacent to the Forest whose interests or traditional uses may be affected by forest management activities. The 2004 FMPM also describes consultation efforts that are "*required if a consultation approach with an Aboriginal community has not been agreed upon, or the Aboriginal community chooses not to use the agreed upon approach.*" The 2004 FMPM further requires that Aboriginal media that may be identified through the consultation process and/or is intended to be used throughout the planning process must be identified as such in the Terms of Reference.

Recommendation 1: The Ministry of Natural Resources must ensure that forest management planning notices to Aboriginal communities are placed in the Aboriginal media identified in the Terms of Reference of the next forest management plan.

During the development of the 2006-2011 FMP there were no issues that required the use of the issue resolution process. There was one request for an individual Environmental Assessment (EA). The proponent had been involved in the consultation process, had attended open houses, requested additional information that was provided and even informed the planning team that they were setting up a special team to further engage the process. MNR sent reminder notices to the proponent reminding them of the various stages the plan had progressed to. However, the group had become engaged in another issue to such an extent that they lost track of the FMP development process and believed that the only way to express their concerns at the last minute was through the individual EA request.

At the time of the audit all parties had agreed to a series of meetings to attempt to find a resolution and had informed the Ministry of the Environment of their intentions. Both the company and MNR made every reasonable attempt to consult with this group and have showed professionalism in continuing to attempt to find a solution.

3.2.3 Native Peoples Consultation

The CFSA and the FMPM require opportunity for Aboriginal input and involvement in the forest management planning process. Aboriginal communities have the option of participating in the standard public consultation process or choosing the additional consultation referred to as the Forest Management

Native Consultation Program (FMNCP). Through this process, the MNR District Manager contacts members of "identified Indian Reserves, Band Councils, Treaty Organizations, and Tribal Councils" regarding forest management planning in their area. Where the First Nation community has opted for their own process, notices are to be advertised in Native media and in the appropriate Native language, if requested by the Native community. The FMPM also requires that MNR develop a Native Background Information Report and a Report on the Protection of Identified Native Values.

There are five Aboriginal Communities within or adjacent to the Lake Nipigon Forest: Sand Point First Nation, Pays Plat First Nation, Red Rock Indian Band, Animbiigoo Zaagi'igan Anishinaabek and Biinjitiwaabik Zaaging Anishinaabek. During the planning process, Poplar Point Ojibway requested to participate. Although Poplar Point Ojibway is not recognized by Indian and Northern Affairs Canada as an official band with reserve status, they were invited to participate in the forest management planning process.

The Stage One FMP direct notification, in the form of the Invitation to Participate was sent as required and the Aboriginal communities were asked by MNR if the notices were required in their Native language.

All of the Aboriginal communities opted for the FMNCP. Pays Plat First Nation, Red Rock Indian Band and Biinjitiwaabik Zaaging Anishinaabek chose to hold information centers in their respective communities. Animbiigoo Zaagi'igan Anishinaabek and Sand Point First Nation opted for their members to attend the general public information centers in either the towns of Nipigon or Beardmore and requested that the general notices be sent to them for mail out to their members. Both Animbiigoo Zaagi'igan Anishinaabek and Sand Point First Nation are only in the early development stages of their respective community.

Stage Two FMNCP Notice requirements to all Aboriginal communities were met and open houses were held as planned. Stage Three FMNCP Notice requirements did not meet the 30-day requirement. However, open houses were held as planned.

The requirements for Stage Four FMNCP Notices for Draft Plan Review were not met. Red Rock Indian Band and Pays Plat First Nation had a change in Chiefs which may have accounted for the Notice not being sent in time to allow for the 30-day notice period. The notice on file for the Draft Plan Review for Biinjitiwaabik Zaaging Anishinaabek does not contain all the required information as per the 1996 FMPM. Despite minor requirements not being met, both Biinjitiwaabik Zaaging Anishinaabek and Pays Plat First Nation held community meetings for the Draft Plan Review. There was no evidence on file to indicate that the Draft Plan Review notice (standard public notice) was sent to Animbiigoo Zaagi'igan Anishinaabek and Sand Point First Nation.

Suggestion 1: The Ministry of Natural Resources should maintain accurate and complete records of consultation with Aboriginal communities in order to be able to demonstrate that requirements of the Forest Management Planning Manual are being met.

An updated Native Background Information Report was completed by Animbiigoo Zaagi'igan Anishinaabek while previous Native Background Information Reports for Red Rock Indian Band, Pays Plat First Nation and Biinjitiwaabik Zaaging Anishinaabek are on file with the 2001-2006 FMP for the Lake Nipigon Forest. Native Background Information Reports were sent to the Ontario Native Affairs Secretariat (ONAS) as required of the FMPM. At the request of the Aboriginal communities, the Preliminary and Final Reports on the Protection of Identified Native Values were not forwarded to ONAS as required of the FMPM due to confidentiality concerns. Ontario Native Affairs Secretariat was notified of this request. As Sand Point First Nation participated in the FMNCP for the first time, the Native Background Information Report and accompanying Values Map prepared for the 2006-2011 FMP summarizes past resource use based on the best available knowledge of the time and are not to be considered comprehensive in nature.

In addition to consultation opportunities for Aboriginal communities to participate in the forest management planning process, it is a requirement for MNR District Managers to conduct negotiations

with Aboriginal communities at the local level in order to identify and implement ways of achieving a more equal participation by Aboriginal peoples in the benefits provided through forest management. MNR met regularly with Red Rock Indian Band, Animbiigoo Zaagi'igan Anishinaabek and Biinjitiwaabik Zaaging Anishinaabek forestry staff to implement forest operations and compliance. All of the Aboriginal communities were invited by MNR to sit on the planning team for the 2006-2011 FMP and all accepted and had representation. MNR provided funding to Sand Point First Nation, Animbiigoo Zaagi'igan Anishinaabek and Pays Plat First Nation for values mapping, which met one of the recommendations from the 2001 IFA.

In the fall of 2005, there remained an issue with Pays Plat First Nation in regards to values collection as they felt not all of the values had been investigated, in particular the values in the Upper Roslyn Lake area. As such, in January of 2006, Lake Superior First Nation Development Trust had extended a community member's contract for an additional two months to complete further investigation. While verification of the pictograph site did not occur (due to coordination with a trapper) additional values were brought forward and existing value descriptions were expanded upon. To date, the finalization of the protection report is still outstanding.

Suggestion 2: The Ministry of Natural Resources should ensure values collection is finalized and supported by Pays Plat First Nation.

Biinjitiwaabik Zaaging Anishinaabek's business plan for a sawmill and commercial fuelwood facility was accepted by MNR. In 2002-2003, the District Manager committed 25,000 m^3/year of birch to Biinjitiwaabik Zaaging Anishinaabek for development of a mill opportunity for a fuelwood business.

The District Manager for the Nipigon District had met with Pays Plat First Nation in 2005 to discuss their desire to start a small sawmill operation to process mainly white birch. The former Chief was advised that MNR would not consider providing a white birch commitment to Pays Plat First Nation and that they should consider negotiating business-to-business agreements with SFL holders in the vicinity of their community (see Section 3.8 for further discussion and Recommendation 26).

3.2.4 Annual Work Schedule Public Inspection

With one exception, notices of AWS Inspection were issued in accordance with the applicable FMPM requirements. The 2004 FMPM also requires MNR to publish a Notice of AWS Public Inspection in local publications in the Aboriginal media. Interviews with MNR staff indicated that the Notice of AWS Public Inspection for the 2005-2006 AWS was not placed in any local publications in the Aboriginal media. The 2004 FMPM has modified the requirements for the involvement of Aboriginal communities in forest management planning, including the provision of the Notice of AWS Public Inspection. The MNR is required to develop a consultation approach with each Aboriginal community in or adjacent to the Forest whose interests or traditional uses may be affected by forest management activities. The 2004 FMPM also describes consultation efforts that are "*required if a consultation approach with an Aboriginal community has not been agreed upon, or the Aboriginal community chooses not to use the agreed upon approach.*" Recommendation 2 has been made to address this finding in light of the requirements under the 2004 FMPM.

Aerial herbicide programs were planned for each year of the audit period. Public notices were placed in local newspapers as required: one at least 30 days in advance and a second notice at least seven days in advance of the anticipated start date of application. Written notices were mailed to select individuals and organizations on the Lake Nipigon Forest mailing list, based on a review of the proposed spray blocks relative to known land tenure and values, including:

- Individuals expressing an annual interest in the aerial herbicide program;
- First Nations/Aboriginal communities;
- Adjacent landowners and other forms of land tenure within one km of spray blocks;

- Permit holders, licensee and other tenure potentially affected, including
  - Traplines,
  - Bear Management Areas,
  - Baitfish Lines,
  - Mining Claims; and
- Other individuals as identified via review.

Notices for the aerial herbicide programs were not published in any Aboriginal media for the 2005-2006 program as required by the 2004 FMPM. The 2004 FMPM has modified the requirements for the involvement of Aboriginal communities in forest management planning, including the provision of the notices of aerial herbicide programs. The 2004 FMPM requirements pertaining to the provision of the Notice of AWS Public Inspection to Aboriginal communities described in the first paragraph of this section are also applicable to notices of aerial herbicide programs.

Recommendation 2: The Ministry of Natural Resources must ensure that the Notice of Annual Work Schedule Public Inspection and aerial herbicide program notices to Aboriginal communities meet the requirements of the Forest Management Planning Manual with respect to notices in the Aboriginal media.

Slash pile burning occurred on the Forest during each year of the audit term. The Company and/or MNR mailed or faxed direct written notices to select individuals from the District mailing list within the timeframe and requirements of the 1996 FMPM.

3.3 Forest Management Planning

3.3.1 Planning Team Activities

This audit reviewed planning team activities as they related to the production of the Lake Nipigon Forest 2006-2011 FMP. The Terms of Reference set out the members of the planning team, their roles and responsibilities. It also outlined a detailed timeline and schedule for the production of the plan. The Terms of Reference was approved by the District Manager and Regional Director as required.

Although the Terms of Reference was well done and complete, it took an exceptionally long time to produce and approve. In fact, the Invitation to Participate was issued March 31, 2004 and the Terms of Reference was approved just over seven months later on November 18, 2004. While the 1996 FMPM does not preclude the initiation of the public consultation process prior to the approval of the Terms of Reference, the 2004 FMPM does. The audit team believes a recommendation is warranted.

Recommendation 3: The Ministry of Natural Resources and Norampac Inc. must ensure the Terms of Reference for the next forest management plan is approved prior to the issuance of the Invitation to Participate.

The MNR Area Forester and the plan author were the co-chairs of the planning team and both were Registered Professional Foresters at the time of plan production, as confirmed by the Ontario Professional Foresters Association. Besides the MNR Area Forester, the planning team included the District Biologist and the Senior Technician acting as Values and Consultation specialists respectively. The planning team also included representatives from Aboriginal communities and the LCC.

Planning team meetings were held once a month during the period of plan development and less frequently during the production and approval of the draft plan. Task teams met in between planning team meetings and provided regular updates on progress to the planning team. The planning team minutes were complete and provided a good insight into how the team functioned. Given the complexity of the issues, it was evident that the parties were able to maintain good professional relationships throughout the process.

Both MNR and Company correspondence binders were found to be well organized and complete. All correspondence and comments received were responded to by either the MNR or the Company. Requests for additional information were met. There was evidence that "memos-to-file" were used to document telephone conversations.

When interviewed, all members of the planning team felt that they had each performed well and were complementary of each other. However, nearly two-thirds of all alterations requested by MNR in the review of the plan were identified by MNR planning team members. This suggests that the team did not function as effectively as possible (see Section 3.3.8 for more discussion and Suggestion 8).

One of the concerns identified by the audit team was the handling of the proposed road link between the Armstrong Forest and the Lake Nipigon Forest. This issue was not new to either the MNR or the Company, as demonstrated by the following:

- The issue is discussed at some length in the 1996-2001 FMP.
- The decision to proceed with an amendment was made in December 2002, including the classification as a major amendment by the District Manager of the Nipigon District. MNR provided additional planning and consultation requirements in July of 2003. Subsequently Norampac decided not to proceed via the amendment process and thus the road link proposal has been examined as part of the development of primary road planning in the 2006-2011 FMP.
- The issue was a topic of discussion at the very first planning team meeting for the 2006-2011 FMP in February 2004.
- The issue is identified in the Terms of Reference, which was approved by both the District Manager and the Regional Director in November 2004.
- In April 2005, the District Manager required the road proposal be withdrawn from the plan, citing the following rational: "*Based on our review we have concluded that there are a number of issues that need further attention before we can move forward with a proposal. There are arguments for and against the road link that need to be fully examined. We recognize that there is significant rationale for the road link to justify pursuing this matter further, while at the same time recognizing that the socio-economic and ecological concerns being raised need closer attention. We have concluded that this requires study that will need to be conducted outside of the ongoing planning process for the 2006 Lake Nipigon Forest management plan.*"
- The Company, BFPL and the MNR have agreed on a series of studies to be completed and that a major amendment to the plan will be required.

It is the belief of the audit team that there was sufficient time in the planning process to have completed the studies identified. The studies should have been included in the Terms of Reference and adequate resources applied to complete them. The discussions should have occurred long before the Terms of Reference were signed.

One of the fundamental principles of the planning system is that decisions that impact the forest environmentally, socially and economically will be decided in an open and consultative fashion. If issues such as this one are too complex for the planning process to handle where then should they be handled? The proposed road link has elicited strong views from both sides of the debate by members of the public. It is also clear there are elements within the MNR that are strongly opposed to the proposal. The audit team believes that these types of issues should be resolved during the public process to maintain public confidence in the process. Given the history of this proposed road link, it seems only appropriate that the decision regarding it be made in an open and public process.

Recommendation 4: The Ministry of Natural Resources and Norampac Inc. must review plan issues at the time the Terms of Reference is being drafted and assign appropriate resources to ensure that issues are dealt with during the planning process.

Recommendation 5: The Ministry of Natural Resources must inform the public of the results of the studies conducted and the decision with respect to the proposed road link between the Armstrong and Lake Nipigon Forests.

3.3.2 Resource Stewardship Agreements

The 2006-2011 FMP includes the required statement confirming the commitment to maintain the viability of the tourism industry by protecting tourism values through the application of the Management Guidelines for Forestry and Resource-Based Tourism[13] and the use of RSAs as one method of protecting and sustaining these values. The planning team also includes a strategy in the FMP in order to meet the commercial tourism objective.

The Ministry of Tourism, Culture & Recreation provided Norampac with a list of resource-based tourism (RBT) establishments as required. Norampac mailed registered letters to all the RBT operators identified in the list to invite them to express their interest in negotiating an RSA. A total of eight responses were received, with five indicating an interest in negotiating an RSA.

The Tourism and Forestry Industry Guide to Resource Stewardship Agreements[14] recommends that a scoping meeting with MNR occur with interested parties before negotiations for an RSA actually occur. MNR strongly urges the interested parties to seek this meeting where MNR can share all relevant policy and information and explain the criteria it will eventually use in deciding whether to approve the RSA proposals for inclusion in the FMP. Discussions with Norampac staff indicated that rather than holding one scoping meeting with all RBT operators on the Forest, Company and MNR held individual scoping meetings with each RBT operator. MNR also produced a Resource-based Tourism Values Map that was made available early enough in the process to be used in the individual scoping sessions with RBT operators.

Norampac took a very proactive approach in trying to anticipate any of the concerns in advance of meeting with RBT operators in an attempt to address concerns as early as possible. According to the Tourism and Forestry Industry Memorandum of Understanding[15] there is a requirement to determine the desired degree of remoteness in the forest and other needs of the resource-based tourism industry. There is ample evidence to suggest that remoteness was the key principle used by the parties in developing prescriptions for the FMP. Concerns such as viewscapes, roads, access and noise were also important in prescription development in the FMP. Maps and other information such as detailed prescriptions for operations were developed and provided to interested parties. Norampac took a very proactive approach in trying to anticipate any of the concerns in advance of meeting with RBT operators, in an attempt to address concerns as early as possible.

Although considerable effort was undertaken to contact and consult with RBT operators, there were no actual RSAs signed and no evidence of any party that desired an RSA. After developing detailed prescriptions for inclusion in the FMP there appears to have been little interest by the parties in developing further documents to define the business relationship.

The values related to the resource-based tourism industry were found to be accurately depicted on the values maps. There appears to be no consistent method of updating the District mailing list when out-post camps and other facilities are bought and sold. This makes it very difficult for those developing the forest management plan to contact stakeholders that may have an interest in forest management activities in the area. The MNR may have to work jointly with the Ministry of Northern Development and Mines-Regional Economic Development Branch-Tourism Specialist to find an effective solution.

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[13] MNR. 2001. Management Guidelines for Forestry and Resource-Based Tourism. Queen's Printer for Ontario. 24 pp. + Appendices.
[14] MNR. 2000. Tourism and Forestry Industry Guide to Resource Stewardship Agreements. 38 pp. + Appendices.
[15] MNR. 2001. Tourism and Forestry Industry Memorandum of Understanding. 3 pp. + Appendix.

Suggestion 3: The Ministry of Natural Resources should develop a system or procedure to assist in consistently updating the District mailing list.

3.3.3 Sources of Direction

During the production and implementation of the 2006-2011 FMP, numerous sources of direction were identified and made available by MNR and used by the planning team. These sources included provincial legislation, MNR policies and guidelines, strategic direction, land use plans and implementation manuals. Most of the information is available to the public through the MNR website.

Business needs of Norampac, overlapping licensees and other forest products companies were presented to the planning team and LCC. The planning team also considered the needs of other users of the Forest including Aboriginal communities, trappers and remote tourism operators.

Other specific sources used by the planning team on the Forest included:

- Crown Land Use Policy Atlas
- Lake Nipigon Basin Signature Site
  - Section 2 - Management Guidelines for the Lake Nipigon Conservation Reserve
  - Section 3 - Management Guidelines for the Nipigon Palisades Conservation Reserve
  - Section 4 - Management Guidelines for the Nipigon River Conservation Reserve
  - Section 7 - Management Guidelines for the Lake Nipigon - Beardmore EMA
  - Section 8 - Management Guidelines for the Orient Bay - Peninsula EMA
  - Section 9 - Management Guidelines for the South Lake Nipigon EMA
- Nipigon District Fisheries Management Plan
- Species at Risk in Ontario list.

A suite of silvicultural ground rules (SGRs) was developed using the Silvicultural Guide to Managing for Black Spruce, Jack Pine and Aspen on Boreal Forest Ecosites in Ontario[16]. The FMP also included a substantial list of literature cited in the plan.

Based on the audit team's observations, the implementation manuals were successfully applied during the audit period. Some exceptions noted by the audit team were the failure to leave sufficient large diameter trees as detailed in the NDPEG and compliance with regulations (see Section 3.4.2).

3.3.4 Introduction

The 2006-2011 FMP introduction included a brief description of how MNR's Statement of Environmental Values (SEV) under the Environmental Bill of Rights has been considered in the development of the FMP, in the form of an SEV briefing note as required. The SEV briefing note was included as Supplementary Documentation–Appendix AD for further reference. An index to the environmental assessment components of the 2006-2011 FMP also formed part of the introduction, as required.

3.3.5 Management Unit Description

Section 2.2.2.1 of the 2006-2011 FMP includes a thorough description of the geology, soils and sites of the Lake Nipigon Forest and there is a general discussion regarding the implication of these factors on management assumptions, strategies and decisions as per the 1996 FMPM (page A-16 lines 6 and 7). For instance, the FMP states that "*forest diversity strategies such as landscape pattern, forest unit composition, preferred habitat for selected wildlife species, and emulation of natural disturbances are directly dependant on the inherent composition and structure of the landscape as determined by geology, soils, and site conditions*" and "*geology, soils, and site condition provide the context for forest management activities on the forest. These factors affect all aspects of strategy development and decision-making*".

[16] MNR. 1997. Silvicultural Guide to Managing for Black Spruce, Jack Pine and Aspen on Boreal Forest Ecosites in Ontario, Book II. Queen's Printer for Ontario. 370 pp.

Given the detailed description of surficial geology and landscape level ecological zones in the FMP, there is room to add text regarding specific implications. For example, the discussion of the long harvest history in the Lake Kelvin eco-section could have been followed with text regarding the possible management implications of the current forest condition in this area (i.e. link to issues section in the forest management plan).

Section 2.2.5 of the 2006-2011 FMP covers the historic forest condition of the Lake Nipigon Forest including an interesting account of logging history and license changes through time. Historic landscape pattern and forest condition are also discussed in general. However, some key subjects, as required in the FMPM, were not addressed. Most notably, a discussion of changes in forest types and the resultant management implications was absent. With such a long harvesting and wildfire suppression history there must have been changes in forest types. For instance, information from past forest resource inventories could provide an indication of any major shifts in forest composition through the decades and be linked to forest composition objectives. In particular, this type of information would have been useful as a precursor to the issues section, which discusses the need to reduce the presence of balsam fir dominated stands and concerns over conversion of conifer to hardwood.

Text regarding implications of geology, etc. and historic forest conditions on the development of the forest management plan is still a requirement of the 2004 FMPM. As a result, the audit team makes the following recommendation to ensure that this important information is included in the next FMP.

Recommendation 6: Norampac Inc. must include all required text in the "Geology, Soils and Sites" and "Historic Forest" sections of the next forest management plan.

Forest management in Ontario requires consideration of a wide array of non-timber values to ensure their protection in planning and operations. Values information is recorded and stored as a part of the Natural Resources Values Information System (NRVIS). Maintenance and provision of NRVIS to planning teams is the responsibility of the MNR. Values information is provided to forest management planning teams in the form of NRVIS datasets that include both descriptive attributes of the value type and their geographic location.

During the preparation of the 2006-2026 FMP, the planning team encountered the following problems with the values information as provided by the MNR. Moose aquatic feeding areas (MAFA) (Figure 4) required updating. New MAFA information was surveyed, but had been provided to Norampac in paper map format. Conversely, new stick nest information was provided as UTM coordinates. The datasets required considerable work by Norampac to make them useable in the forest management planning process. Review of NRVIS at the MNR office in Nipigon revealed that problems had been resolved at the time of the audit. Improvements in data sharing between the MNR and Norampac are apparent. However, the problems encountered during the preparation of the 2006-2011 FMP require reflection in the audit, particularly so given the need for updated and accurate NRVIS information for AWS preparation. The following recommendation is provided.

Recommendation 7: The Ministry of Natural Resources must ensure that Natural Resources Values Information System information is provided for Forest Management Plan and Annual Work Schedule preparation, as described in the Forest Information Manual. ***(Repeat recommendation from 2001 IFA.)***

The principle source of data used to describe the management unit is the Forest Resource Inventory (FRI), supplemented by surficial geology and hydrology information from other sources (e.g. National Topographic Series and Northern Ontario Engineering and Geological Terrain Survey). The FRI for the 2001-2006 FMP was developed using 1976[17] aerial photography (1:15,840 black and white) and the 2006-2011 FMP is based upon 1995 aerial photography at a 1:20,000 scale. The interpretation of

[17] The former Auden Forest Management Unit FRI was based on 1985 photography.

Figure 4. A moose aquatic feeding area (MAFA) on the Lake Nipigon Forest.

photographs met MNR standards that have been in place since the 1960s. This critically important data source has been properly maintained and updated by the Company on an annual basis. The procedures used for this update are thoroughly documented.

Prior to the implementation of the Forest Information Manual[18], the FRI was scheduled for renewal every 20 years to reflect changes (e.g. forest succession and natural disturbances) that are not accounted for in annual updates of harvest and the occasional wildfires. The 2001-2006 FMP should have had a completed inventory from the 1995 photography. The time from photography to planning inventory should only take two to three years. Numerous production delays required the planning team to use the old inventory. Additional work was also required to estimate losses due to a budworm outbreak that occurred after the 1975 photography.

The MNR is responsible for providing base data such as administrative layers and FRI data for parks and other parts of the forest that are not part of the managed land base. These data were not provided to the Company on time (e.g. updated land tenure layer) but in the end the MNR data was used in the planning inventory. The audit team noted that the Company and the MNR have developed a good relationship to work out these problems.

MNR has recently completed a comprehensive review of the land tenure layer to ensure its accuracy. Land tenure review is an onerous task, with title searching necessary for final resolution when discrepancies are determined. According to MNR, a thorough review had not been conducted since the establishment of the Lake Nipigon Forest Forest Management Agreement in the early 1980s.

[18] MNR. 2001. Forest Information Manual. Queen's Printer for Ontario. 320 pp. + Appendices.

The quality of forest inventory has a direct bearing on the quality of planning, from the description of the forest to strategic decision-making and operational planning. Although both the Company and the MNR made do with the information in hand, there is clearly a need for improvement. Recently, the MNR has begun a program to improve FRI standards. This is an important initiative and therefore no recommendation is warranted.

Notwithstanding the above weaknesses in the base information, both the 2001-2006 and 2006-2011 FMPs provide good descriptions of the Forest. However, there are limited and very general statements concerning the forest management implications of the forest condition. These interpretations provide valuable context. Although the generalized interpretations might meet the minimum FMPM requirements, there are opportunities for improvement in the next FMP.

The socio-economic profile provided in the FMP met the minimum requirements. The profile tends to be more of a regional profile rather than a management unit focused profile, with information drawn from the 2001 Census[19] and the Ministry of Northern Development and Mines community profiles. Information on non-industrial uses of the Forest was very well done compared to other profiles reviewed in the past.

One of the areas the auditors are asked to examine is whether forest operations are adding value to the community. In the case of the Lake Nipigon Forest, this would apply to the communities of Greenstone, Nipigon, Thunder Bay and six Aboriginal communities. It is apparent from the profile that all identified communities receive economic benefits from the management efforts on the Forest. Wood volume and direct employment figures are provided. However, there is no information on the financial benefits or the indirect employment benefits arising from the Forest to these communities.

Community representatives and members of the public have all expressed concern over the economic future of the communities and the region to both the LCC and the planning team. The MNR and the SFL holder have traditionally relied on the socio-economic profile and the Social Economic Impact Model (SEIM) to address the planning requirements. This is discussed further in Section 3.3.6.

3.3.6 Objectives and Strategies/Management Alternatives

Objectives and targets in the 2006-2011 FMP addressed forest diversity, socio-economics, forest cover and silviculture topics as required by the CFSA and FMPM. Objectives were divided among quantitative types which were evaluated between management alternatives, and qualitative objectives which were held constant between scenarios.

Mandatory management alternatives were analyzed and documented as required by the FMPM. These included scenarios to test the timber production potential of the Forest with an infinite level of silviculture spending; timber production potential with balanced silviculture spending; and the ability of the Forest to meet anticipated industrial demand. The Natural Benchmark (Null) scenario, where no harvest occurs and wildfire is the only source of forest depletion and renewal, was used to provide a basis for calculating allowable bounds of variation for some quantitative objects such as wildlife habitat, forest unit group areas, and old forest cover.

The 2006-2011 FMP management alternatives were analyzed with the Strategic Forest Management Model (SFMM), with results and input assumptions discussed in the FMP text and the Analysis Package. The FMP provided an excellent discussion of the assessment of forest sustainability and comparison of objective achievement between management scenarios. Strategic modeling supported the selected management alternative in terms of sustainability and comparison to the other alternatives in a cost-to-benefit analysis. The Selected Management Alternative (SMA) also ensured operational feasibility, as it accounted for the seasonal portioning of harvest areas.

[19] Statistics Canada. 2001. Canada Census of Population.

The Analysis Package was comprehensive and provided good information on the development of the management alternatives, model input parameters, and underlying assumptions. Model parameters were well supported and satisfied all requirements.

Natural succession rules were examined during model development to check for any significant volume changes due to succession (e.g. when comparing stand volumes before and after succession points). This analysis focused on rectifying significant volume changes (e.g. greater than 30 m^3/ha and more than 2% succession). The audit team noted that the model contained multiple succession rules which resulted in large volume changes (greater than 50 m^3/ha) for both small areas of succession and more substantial proportions. The impact of these volume changes did not appear to have a significant impact on model output, but do illustrate an area for further improvement. All suggestions provided within this section are combined into Suggestion 4 found at the end of this section.

The modeling for 2006-2011 FMP used the "accumulating reserves" function in SFMM to account for areas set aside from harvesting for the protection of riparian, wildlife and tourism values. A more accurate method of accounting for these reserves is to include known areas directly into the planning inventory prior to loading the landbase into SFMM. This method has the advantage of providing a more accurate reflection of areas reserved from harvesting in terms of forest unit and age-class by sub-unit, and reduces errors between planned reserve areas and those forecasted by the model. For example, Table FMP-19 illustrates SFMM projections exceeded actual planned reserves by 60% (6,800 ha) for the 2006-2011 FMP. These discrepancies point to the need to review the calculation and incorporation of areas reserved from harvesting into the strategic model.

The audit team also noted a decrease in harvest yields from the Forest in recent plan terms (e.g. 1991 onwards) and a discrepancy between planned and actual yields. This disparity is described in Section 3.7.3 and Table 10 and Table 11.

Suggestion 4: Norampac Inc. should, during the preparation of the next forest management plan:

- **Review the assessment of areas set aside from harvesting and incorporate existing reserves into the planning inventory to provide the model with a more accurate reflection of areas reserved from harvesting.**
- **Review succession rules to ensure agreement between pre- and post-succession volumes.**

The SEIM analysis was completed and included in the FMP as required. However there is no evidence to suggest that the results of the model were ever reviewed by the planning team or the LCC. In addition, the SEIM model outputs are so general that meaningful conclusions at the forest management unit level can not be made. Better analysis should be provided to the planning team, to allow the effective analysis of socio-economic impact of the decisions being made. MNR should consult with the Ministry of Northern Development and Mines-Regional Economic Development Branch for assistance. There is an internal protocol between these two Ministries to address the provision of social and economic analysis and interpretation in support of forest management planning.

3.3.7 Operational Planning

Area of Concern Planning

Known values are protected from potential negative impacts of forest management activities through the development of Area of Concern (AOC) prescriptions. The 2006-2011 FMP includes a range of AOC prescriptions that are either generic or individual in design. Generic AOCs are provided for groups of AOCs with a common value(s) and a common prescription. Individual AOCs are applied to AOCs where the generic prescriptions do not address the prevailing conditions, or where additional rationale for the prescription is required. Numerous individual AOC prescriptions are included to protect tourism interests

on identified lakes. AOC prescriptions are consistent with provincial direction at the time of plan development and are documented as required.

The 2001-2006 FMP included an AOC for the protection of ground water recharge zones (GRZ). During the implementation of that plan, the MNR was to have conducted field work to define, identify, verify and confirm the location of the GRZ values (as per Forest Information Manual requirements). Limited field work was performed leaving the identification of specific locations of the GRZs incomplete. The GRZ AOC was not included in the 2006-2011 FMP. Rather, the FMP includes best management practices that protect sensitive sites across the entire Lake Nipigon Forest. These practices were extracted from MNR Implementation Manuals and Guides as well as specific guides and procedures developed by Norampac. The 2006-2011 FMP also includes a set of strategies to allow for an assessment of the impacts of GRZs on operations as well as to develop methodologies for the identification and verification of potential GRZs. This work was proposed for the Dublin Creek coldwater fisheries, an important brook trout fishery.

Silviculture Planning

The 2006-2011 FMP includes a very thorough set of approximately 172 ecosite-based silviculture ground rules (SGRs); each contains one to several silviculture treatment packages (STPs) based on available treatments. Preferred STPs, conditions of "conditionally recommended" treatments and exceptions to silviculture guides are identified in the SGRs. In addition, the FMP text fully describes all facets of the SGRs.

The SGRs in the 2006-2011 FMP were an improvement over those in the 2001-2006 FMP in many respects, such as the changed format and new naming convention (e.g. SPCtoSPCIntensive1C). The number of SGRs was also reduced substantially. These revisions made the SGRs more intuitive and user-friendly; unfortunately, some utility/important linkages were also lost in the update. Firstly, target stocking was removed (the provincial minimum stocking of 40% is maintained). In this case, the important connection between the SGR (the "tool kit" for meeting most forest-related targets) and the plan objective "to maintain/enhance forest productivity" is lost. This was identified as an HPA as well.

Secondly, acceptable species listings in the 2006-2011 FMP SGRs are limited by present forest unit species composition averages. For example, the SGR PJCtoPJCExtensiveC depicts an extensive treatment (i.e. natural regeneration) from a pine dominated stand condition (PJC) to a similar condition (PJC) on coarse soils. In this case jack pine is listed as the crop species and only poplar is allowed as an acceptable species (since it is the only other species in the present PJC forest unit description); but spruce should be added as an acceptable species as it could be present following harvest. This is particularly true in older pine stands where advanced growth spruce is often present, but may not be included in the FRI as it is in the understorey of the stand. In this case, harvest and silviculture treatments will not emulate the stand-replacing wildfire that produced the original stand as spruce and other species will remain on site. In other cases the acceptable species list/desired future forest unit does not take into consideration the original forest unit composition. For instance, the SGR BFMtoPOHExtensiveC does not have an allowance for balsam fir and the SGR CEUPtoPOHExtensiveC does not allow for cedar; even though the original stands were dominated by balsam fir and cedar, respectively. Obviously, it does not make sense to overlook the species that presently dominate sites, especially when extensive treatments are planned. In most cases, following depletion (including harvest activities), pre-harvest species maintain a significant presence on site as advanced growth or through seeding. This is known as "site legacy".

In summary, if the acceptable species listings are not revised accordingly, some of the stands managed under these SGRs will likely not be a silviculture success in the future. As a result, the audit team makes the following suggestions.

Suggestion 5: Norampac Inc. should revise Silvicultural Ground Rules such that acceptable species lists include those species that have a high potential for being on site post-harvest.

Suggestion 6: Norampac Inc. should consider re-instating target stocking or updating the measure of site occupancy in the Silvicultural Ground Rules to correlate with the Well-Spaced Free-Growing Regeneration Manual[20] (i.e. list the target and minimum number of well-spaced free-growing trees).

As a safeguard, Norampac may want to limit the amount of some acceptable species. This would allow presence of a larger number of species at the time of assessment while still ensuring the desired future forest condition can be achieved. For example, balsam fir was limited to less than 10% in some SGRs in the 2001-2006 FMP.

One silviculture exception is noted in the 2006-2011 FMP – full tree logging on very shallow-soiled sites. This exception is rationalized and a monitoring program is included in the plan. The monitoring program consists of collaborating with the Centre for Northern Forest Ecosystem Research regional shallow soils study.

Renewal support requirements have been minimally documented in the 2006-2011 FMP. Important information regarding method of seed collection or procurement of seed or seedlings is absent in the FMP. In addition, white spruce and red pine seed requirements are not considered in the FMP.

Suggestion 7: Norampac Inc. should include all required renewal support information in future forest management plans.

In the 2006-2011 FMP, information regarding the program for assessments of regeneration success is too general. For example, it is stated "*Assessments will be conducted as part of the annual operations and will be performed according to the latest assessment guidelines and documentation*". This does not fulfill the requirements of the 1996 FMPM (page 133), which outline "*The descriptions of the program, and the methods to be used, should include information on when monitoring will be carried out; the duration of monitoring and how the results of monitoring will be documented and reported*". Other requirements of the FMPM regarding monitoring are also not present (e.g. discussion of the relationship between the planned harvest area and the area expected to regenerate within the acceptable time periods).

Recommendation 8: Norampac Inc. must ensure that all required text regarding the monitoring and assessment program is included in future forest management plans.

Harvest Planning

Selection criteria for areas eligible for operations were consistent with the eligibility criteria found in the 2001-2006 FMP. Eight selection criteria were tied to eligibility criteria based upon stand age. Stands classified as mature were allocated as well as stands approaching rotation age. Overmature forest stands were not defined by age. In addition to those identified for harvest, six selection criteria were identified for renewal and tending. The FMP asserts that:

> Generally the allocation process attempted to avoid allocation of stands, which were not considered "mature", and those which were considered over-mature, in order to avoid harvesting stands which had not reached, or long ago began to decline in, peak stand volume (Section 2.3.11.1, p.359, 2006-2011 FMP).
>
> In addition to the age criteria, stands that were just below rotation age and received detailed photo interpretation, ground surveys, or aerial reconnaissance and were subsequently identified as operable, were also identified as eligible (Section 2,3,11.1, p.360, 2006-2011 FMP).

[20] MNR. 2005. Well-spaced Free-growing Regeneration Assessment Procedure for Ontario. NWSI Technical Report TR-000. 33 pp. + Appendices.

An explanation of the rational behind the selection criteria's relative importance in selecting areas for operations is included within the FMP text. Public input has been integrated into the selection process as is evident from the Nipigon East Area LCC Omnibus Report.

Areas selected for harvest for the selected management alternative in the 2006-2011 FMP are consistent with the Available Harvest Area (AHA) by forest unit as described in the FMP text and in Tables FMP-18 and FMP-19. There is some substitution of age classes in the allocations compared to the AHA generated by SFMM. These substitutions were required to meet the management objectives (i.e. caribou mosaic) in an operationally feasible manner. Contingency areas are also identified in the 2006-2011 FMP and text clearly explains that these areas will be used as replacement for normal harvest areas that may become unavailable during the plan term. Overall contingency area represents six months of harvest area (based upon total harvest area for the five year term).

Roads Planning

Through the forest management planning process, planning of primary and secondary roads must consider a reasonable range of practical alternatives. Primary and secondary road planning was completed in compliance with required procedures. Access planning for primary and secondary roads was comprehensive and met the requirements of the FMPM.

The Forest Management Guidelines for the Conservation of Woodland Caribou: A Landscape Approach[21] describes site-specific recommendations, including road rehabilitation measures. The 2006-2011 FMP is consistent with the caribou guidelines, in particular by including roads planning prescriptions specifically for woodland caribou in some cut blocks located within the caribou management zone. However, the audit team sees provincial direction to be inadequate for the following reasons:

- The caribou guidelines were officially recognized in 1999 without modification since their release in draft form in 1997;
- The guide has been in effect for nine years and was reviewed once in 2000;
- The Declaration Order regarding MNR's Class Environmental Assessment Approval for Forest Management on Crown Lands in Ontario[22] (Condition 38) requires that guides be reviewed every five years (a review is one year overdue);
- In May 2002, the status of woodland caribou was elevated to the threatened species level by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). COSEWIC is responsible for maintaining species status under the federal Species At Risk Act[23] (2002, c.29);
- The same forest management considerations for woodland caribou that were developed in 1997 still apply, while the sustainability of the species becomes increasingly questionable.

Although the audit team has been informed that new landscape guidelines are being developed and that caribou guidelines are to be enveloped therein, very little changes have occurred to the manner in which forest management planning considers woodland caribou. The audit team questions whether or not new science relating to woodland caribou will be included in the landscape guide, particularly since the last review of the caribou guidelines occurred more than five years ago, contrary to the Declaration Order.

Recommendation 9: The Ministry of Natural Resources must ensure that the new Landscape Guide include current science respecting woodland caribou consistent with the spirit and intent of the Declaration Order MNR-71.

[21] Racey, G., A. Harris, L. Gerrish, E. Armstrong, J. McNicol and J. Baker. 1999. Forest management guidelines for the conservation of woodland caribou: a landscape approach. MS draft. Ontario Ministry of Natural Resources, Thunder Bay, Ontario. 69 pp.

[22] Ministry of the Environment. 2003. Declaration Order regarding MNR's Class Environmental Assessment Approval for Forest Management on Crown Lands in Ontario. 48 pp.

[23] Species At Risk Act. 2002, c.29.

Development of the Landscape Guide should include a in-depth review of scientific literature related to woodland caribou habitat and forest management activities; and should thoroughly describe associated information gaps to guide scientific study for the next review.

3.3.8 Plan Review, Approval

The review and approval of the 2006-2011 FMP followed the process as outlined in the 1996 FMPM. The required alterations were well done and professional. The List of Required Alterations was reviewed by the MNR forester for completeness and redundancy. Reviewers were required to supply proposed text changes in an electronic form. This was a good method that should be employed more often, as it ensures that the reviewers' comments and concerns are accurately communicated. It also allows the plan author to clearly see the context of the comment and decide if further discussion is required. The plan author had no complaint with the majority of the required alterations, or the timeliness of them. The plan author addressed all required alterations either by incorporating the required changes, or discussing changes with specific reviewers and coming to agreement on the appropriate change.

In total there were 712 alterations, of which 367 (52%) were identified as "Required", while the remainder were split between "Editorial" and "Suggestion". There were a total of 16 reviewers split between the district, region and planning team. All except one reviewer were part of the identified support team for the FMP. Planning team members accounted for 68% of the overall comments and 66% of the required comments. The Region accounted for 29% of the required alterations and three of the regional reviewers accounted for 72% of those comments. Table 3 provides a summary of these findings.

Table 3. Summary of alterations for the 2006-2011 Lake Nipigon Forest FMP.

Reviewer	Comment Type				
	Comment	Editorial	Required	Suggested	Total
1			2		2
2			3		3
3	1		3		4
4		2	1	1	4
5		1	5		6
6			15		15
7	3		8	7	18
8		4	26		30
9	5	10	16	6	37
10	5	31	28	19	83
11			5		5
12			5		5
13	3	6	6		15
14		1	9		10
15	20	5	113	8	146
16	50	94	122	63	329
Grand Total	**87**	**154**	**367**	**104**	**712**
	12 %	**22 %**	**52 %**	**15 %**	**100**

		% of Total	% of Required Alterations
	Region	28	29
	District	4	4
	Planning Team	68	66

With a total of 712 comments, this plan had one of the lowest numbers of comments the audit team has seen in past reviews. Interviews with both the plan author and the MNR Area Forester indicated that good communication during the development of the FMP, and the fact that the Company staff had produced the Armstrong Forest 2005-2010 FMP the year before, were both contributing factors. There were also efforts made to pre-submit sections for review, anticipating a reduction in revisions at the Draft Plan stage. However, 712 comments still represent a significant workload to generate the alterations and adequately address them. The fact that nearly two-thirds of all alterations came from the planning team suggests that the planning team was not as effective in working on the development of the plan as they should have been. The fact that three regional reviewers generated 72% of the Region's comments and these same individuals were part of the support team suggests there is room for improvement in the interaction of these positions during the plan development phase.

The audit team is asked to determine whether the dual role of plan advisor or planning team member and that of reviewer was beneficial to the review of the plan. While there is little doubt that the involvement of these individuals resulted in a better plan than would have been produced had they not been involved there is room for improvement. The comments were reviewed for content and plan section and found to be appropriate. The concern then becomes a function of the number and origin of the comments. The planning process has become so complicated that it is no longer possible for a single plan author to produce a plan that will meet the approval of all those who review it. In some cases the reviewer should probably have been the author of the section being reviewed. In fact, planning team members should probably not be part of the formal review as they should be focused on contributing to the production of the plan being submitted. For this reason, the following suggestion has been made.

Suggestion 8: The Ministry of Natural Resources should evaluate the roles, responsibilities and training of planning and review team members to reduce the number of required alterations.

3.3.9 Plan Amendments

Plan amendments were prepared and certified by the plan author or his successor and both held R.P.F. designation at the time of each amendment.

During the implementation of the 2001-2006 FMP there were a total of 40 amendments; 30 were categorized as administrative, nine were categorized as minor and one was categorized as major. Generally the number of amendments does not appear to be a problem. Half of all the administrative amendments occurred in the first year of the plan and involved minor changes to account for changes in stream locations. The majority of the minor amendments were initiated in order to conduct salvage operations in response to Nipigon Fire 12 near Beardmore. The remaining amendments were for harvest block adjustments and roads. The major amendment was required to add a new primary road and modify two secondary roads. The categorization for all amendments was found to be appropriate. The master list of amendments was complete and amendment record binders were well prepared and readily available. The LCC meeting minutes indicated that amendments were reviewed with the LCC as required.

The one area for improvement with respect to amendments is the time taken for approval. Based on approval dates in the master list, administrative amendments took an average of 107 working days from submission to approval. This average is largely driven by a number of amendments that took over a year to approve. These amendments were non-critical and pertained to revision of FMP documentation of values and AOC prescriptions. If these are removed from the analysis the average falls to 30 working days or six weeks. Table 4 and Figure 5 provide overviews of the amendments by year.

Table 4. Summary of amendments by year and average approval time for the Lake Nipigon Forest.

	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	Total
Administrative Amendments (#)	18	5	0	4	3	30
Average Working Days to Approve	149	24	0	77	34	107
Minor Amendments (#)	2	2	2	2	1	9
Average Working Days to Approve	52	21	14	98	132	56
Major Amendments (#)	0	0	0	1	0	1
Average Working Days to Approve	0	0	0	109	0	109
Total # of Amendments	20	7	2	7	4	40

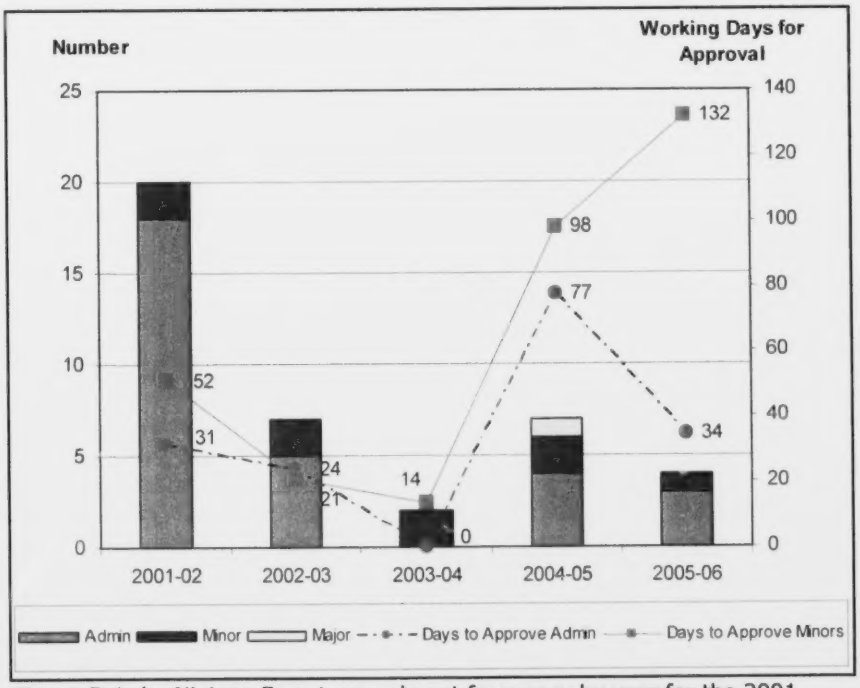

Figure 5. Lake Nipigon Forest amendment frequency by year for the 2001-2006 term.

As already mentioned, there were nine minor amendments and one major amendment to the 2001-2006 FMP approved during the audit period. Minor amendment preparation requires one formal opportunity for public consultation. Public notices were issued for most of the proposed minor amendments and provided the public at least 15 days to submit comments. Evidence was lacking for public consultation on minor amendment #17. Discussions with MNR indicated that both discretion and advice from the LCC were used to decide whether both mail-outs and newspaper ads would be employed to notify the public of each amendment proposal and approval.

The 1996 FMPM requires that in addition to direct mail outs, notices will also be placed in local publications in the Aboriginal media, which did not occur. The 2004 FMPM has modified the requirements for the involvement of Aboriginal communities in forest management planning, including the provision of the notices of FMP amendments. The MNR is required to develop a consultation approach with each Aboriginal community in or adjacent to the Forest whose interests or traditional uses may be affected by

forest management activities. This may or may not involve placing notices in the Aboriginal media. The 2004 FMPM also describes consultation efforts that are "*required if a consultation approach with an Aboriginal community has not been agreed upon, or the Aboriginal community chooses not to use the agreed upon approach.*" In these two situations, a media notice is required to be placed in the Aboriginal media.

Recommendation 10: The Ministry of Natural Resources must ensure that amendment notices to Aboriginal communities meet the requirements of the Forest Management Planning Manual with respect to notices in the Aboriginal media.

Public consultation requirements for the major amendment were met. Public notices were published in local newspapers and the EBR, written notices were mailed out and an information centre was organized. MNR also contacted each First Nation regarding the proposed major amendment and consultation opportunities. The major amendment was approved and MNR sent written notice of the approval to all respondents of the public consultation process.

The FMPM requires that amendments be distributed to each location that houses an approved final copy of the FMP. In addition to the MNR district office and the office of the SFL holder, approved administrative amendments are to be forwarded by April 30 of each year to the appropriate MNR regional office, the MNR Forest Management Branch and a location in Toronto as provided by MNR. Minor and major amendments are to be distributed to the above mentioned locations immediately upon approval. Interviews with MNR indicated that none of the administrative, minor, or major amendments had been distributed to the required locations during the specified timeframes during the audit period.

Recommendation 11: The Ministry of Natural Resources must ensure that all amendments are distributed in a manner consistent with the requirements of the Forest Management Planning Manual.

3.3.10 Contingency Plans

There were no contingency plans during the audit period.

3.3.11 Annual Work Schedules

Annual work schedules were completed which fulfilled the FMPM requirements. The planned operations were consistent with the approved FMP. AWSs included an Annual Compliance Schedule of Action that outlined scheduled compliance activities as required and included planned compliance activities for each overlapping licensee.

Forest Operation Prescriptions (FOPs) in the 2001-2002 through 2005-2006 AWSs consist of a statement signed by a Registered Professional Forester, that certify that scheduled harvest, renewal and maintenance operations are in accordance with the FMPM requirements, and are appropriate for the site conditions encountered as they are currently known. This text was slightly altered in the 2005-2006 AWS as per the 2004 FMPM to include access operations and remove the disclaimer related to site conditions "*as they are currently known*". FOPs also consist of stand listings in each AWS that contain Silviculture Treatment Package (STP)/FOP codes for all stands planned for harvest, site preparation and renewal and tending operations. As a final step, to allow a spatial definition of forecast operations, the codes are linked to the Areas Selected for Operations maps.

Detailed information regarding FOPs is also included in each AWS. For example, "*A Forest Operations Prescription is a site-specific, integrated set of harvest and renewal and tending activities which is developed before any operation can commence on a particular site. Forest Operations Prescriptions in the AWS have been developed based on professional judgment, past experience on similar sites and local expertise of Domtar (Norampac) forestry department technical and professional staff*". In addition, Norampac included two-digit site condition modifiers to the FOP codes as a proxy to ecosite coding. The

first digit of the codes indicates the soil type and the second digit indicates the anticipated competition level.

Forest Operation Prescriptions have been completed as per the 1996 FMPM and are consistent with the SGRs in the 2001-2006 FMP. FOPs were completed in all AWSs prior to operations commencing on site; however, some changes were made that were not appended to the AWS. For example, Stop 14 Block 500 had portions that were mechanically site prepared in preparation for planting, although the treatment in the AWS is natural renewal to poplar and birch mixedwood stands.

MNR and Norampac noted in AWSs during the audit term that updating AWSs with new FOP information was a task that required streamlining; this was not done. Rather, updates to FOPs have been recorded in Annual Reports. This is a non-conformance according to the 1996 and 2004 FMPMs.

The FMPM requirements regarding appendage of FOP changes to AWSs are not onerous. Simply, some time following a change of prescription (no time line is given), the Norampac R.P.F. must send a certified (i.e. signed with R.P.F. stamp) page with change(s) to the MNR Area Forester to add to the AWS (note that all official AWS copies need to be appended). The page will normally consist of a stand summary with new FOP number(s). There is no revision or review of the AWS required.

Considering the minimal requirements, Norampac and Nipigon District MNR staff should not be looking to streamline the process and should follow FMPM direction.

Recommendation 12: The Ministry of Natural Resources and Norampac Inc. must ensure Forest Operation Prescription changes are appended to Annual Work Schedules.

3.4 Plan Implementation

3.4.1 Areas of Concern

A number of AOC prescriptions were examined as part of the field portion of the audit, including reserves associated with water quality and the protection of fisheries, moose aquatic feeding areas, raptor nest sites, canoe route viewshed protection and tourism viewshed protection. AOC prescriptions were well implemented with boundary marking accurately performed. Where AOC incursions had occurred, compliance inspections had accurately reported the incursions.

3.4.2 Harvest

Harvest operations must be conducted in compliance with all current laws and regulations, including the CFSA, and the approved activities of the FMP and AWS. To aid the audit team during the field audit, Norampac prepared background information for each area to be audited. Information included maps, FOP, location of roads, AOC, silviculture treatments and forest operations inspection reports (FOIR). The audit team inspected 8,209 ha of harvesting operations (Figure 6), which represented 22% of the total harvest that occurred during the audit period. All harvest areas viewed in the field were approved in the FMP and AWS. Field observations were consistent with compliance inspection reports. Amendments, as required, were made to the FMP to ensure planned harvesting was approved in the FMP.

There is a wide range of surficial deposits on the Lake Nipigon Forest, with bedrock-controlled topography present throughout most of the Forest. The northern portion of the Forest has more subdued topography and is comprised largely of ground moraine and lacustrine soil deposits. Bedrock areas are typically more moderately to heavily broken in the southern half of the Forest and soils are frequently shallow. These topographical conditions, combined with older forest stands and areas with a legacy of historic harvest and river drives, have created some areas where heterogeneous stand conditions dominate. The large variations in terrain and forest conditions create a challenging environment for conducting cost effective and environmentally benign harvest operations.

Figure 6. Mosaic of new and older harvest areas.

The annual reports were reviewed to determine if the harvest profile (forest units and age classes) was implemented to follow the planned profile (Table 5). The reports only cover four years of the planned harvest within the audit period so the figures are prorated by adjusting planned levels by $^4/_5$ or 80%. The lowland and pure spruce forest types (i.e. SpL and SpC), although the dominant forest condition, are harvested at a rate lower (81%) than the average (90%) and lower than other forest units dominated by pine and aspen cover types. It should be noted that for some of the smaller forest units (e.g. PjC) a very large proportion of the available area was cut in the first few years of the audit period. By showing the harvest as a percentage with the denominator calculated by taking 80% (or $^4/_5$) of the five year available area, the actual percentage cut may be overstated in some cases.

Part of the observed trend reflects operational constraints arising from the terrain. For example, road right of ways will tend to be concentrated on sites and forest units associated with deeper soils. Some winters did not have sufficient duration or conditions to allow a full harvest of lowland and shallow sites. In addition, sawlog ratios are lower in the spruce types and hence the economic returns are lower under certain market conditions.

Table 5. Summary of projected versus actual harvest area by forest unit, for the Lake Nipigon Forest during the 2001-2005 four-year term.

Forest Unit	Pro-rated[a] Planned Harvest Area (ha)	Actual Depletions[b]	Proportion of Actual/Planned Harvest Area (%)
SpC	7,438.4	6,022.3	81
SpL	6,321.6	5,120.1	81
SpM	6,089.5	5,719.6	94
Other Forest Units	7,703.1	7,863.0	102
Total	27,552.6	24,725.0	90

[a] 80% of five year projected harvest

[b] From AR-1 of respective Annual Reports 2001-2002 to 2004-2005

Note: Neither the projected nor the actual harvest areas include salvage figures.

There is a need to recognize the economic constraints to the harvesting operations in developing the strategic direction of forest management plans. There is also a need to balance short term economic efficiency against longer term economic viability. The magnitude of the age class substitution in allocating stands at the operational planning stage (Section 3.3.7) and the relatively higher concentration of harvest on better sites in the plan implementation phase are not considered to be a major problem for the period under review.

However, if this pattern persists over longer periods of time the economically viable harvest chances could be lower than forecasted in the forest management plans. This is especially true for caribou mosaics. If less desirable stands that are allocated are systematically bypassed, they may never be harvested or the road network will remain active longer than under conditions where the entire block of both good sites and poor sites are harvested at the same time.

Accumulating reserves are used to model the expected impacts from bypassing timber for NDPEG and wildlife guidelines in SFMM. It may be prudent to further adjust these reserves to also account for areas that are not expected to be harvested due to economic factors.

Suggestion 9: The planning team members (both Norampac Inc. and Ministry of Natural Resources) should review the pattern of past harvests and ensure that the harvest patterns and allocations take into account economic factors to the extent possible in developing the next forest management plan.

The audit team noted that operations considered site conditions and were conducted to minimize disturbance on the majority of sites. Isolated cases of site disturbance were found on several blocks, and trespasses, also reported by the compliance program, were noted at one block (BLK Block 500). All findings within this section are combined into Recommendation 13.

The audit team observed problems with tree retention in terms of the number and size of trees left onsite (Figure 7). In many areas it was evident from examining stumps that sufficient tree size ranges were often available, suggesting that the tree retention problems can be corrected with better operator training or incentives. This problem was prevalent on conifer dominated sites. On birch mixedwood sites the residual trees exceeded the guidelines. However, these residuals may cause some concerns with forest renewal (see Section 3.4.3, Suggestion 11).

Figure 7. Example of poor tree retention.

Instances of wasteful practices and stranded processed wood were observed (Figure 8). On many of the blocks there were several harvested trees in singles and bunches found in the block. An examination of the slash piles revealed several instances of merchantable stems that were left behind or partially processed. Also found at roadside were trees with defect that could have been left standing as wildlife retention trees. Although weather, terrain and forest conditions can combine to create difficult conditions that impair utilization, operators on other forests appear to be more successful in meeting these challenges. The audit team believes opportunities exist to increase yields through better utilization. Also, greater care or different equipment choices can also reduce breakage and increase utilization.

Figure 8. Examples of wasteful practices and/or stranded wood.

Several blocks visited during the field audit used in-bush chipping technology. This equipment dramatically improves utilization versus conventional systems; however, the audit team notes that there are trade-offs between the two systems. For instance, for chipping areas, although road densities are lower compared to conventional roundwood systems, they are built to a higher standard and skidways are concentrated at landings that are spaced at about 200 meters. These concentrated skidways can create more localized site disturbance compared to conventional roundwood systems. In addition, although there are no slash piles at roadside, chipper debris can make sites unproductive near the landing. These are localized effects but the audit team has viewed other SFLs where chipper debris was managed by spreading, site preparing and planting to bring the land back into production.

Suggestion 10: Norampac Inc. should find ways to improve the site rehabilitation of landings that are covered with chipper debris.

Recent improvements in slash management were noted, but many examples of poor slash management were observed (Figure 9). Other forests in the region have seen significant improvement in slash management and utilization during recent years. Some SFL companies have gone back to old blocks to recover productive forest area lost to slash piles as a project funded by the Forestry Futures Trust.

The problems observed with utilization and slash management have been identified in previous audits. There is some evidence of progress in slash management. Although some effort was made to pile and burn most slash piles, the use of skidders to do the job is not as effective as other methods.

Recommendation 13: The Ministry of Natural Resources and Norampac Inc. must improve utilization, tree retention and slash management practices. ***(Repeat recommendation from previous IFA.)***

Figure 9. Example of poor slash management.

3.4.3 Renewal, 3.4.4 Tending and Protection, 3.4.5 Renewal Support

The audit team viewed a sampling of renewal, tending and renewal support activities from those areas where activities were conducted during the five-year term of the audit. The sample included examples from each type of activity and from each of the five years being audited to assess the success of the prescriptions.

Renewal treatments completed during the audit term consisted of natural renewal of hardwood dominated upland and lowland stands (using Careful Logging Around Advance Growth (CLAAG), see Figure 10). Mechanical site preparation treatments (mainly patch site preparation with some trenching and a few areas of chemical preparation) and planting of spruce/pine or seeding of jack pine occurred on the majority of upland conifer or mixed wood stands.

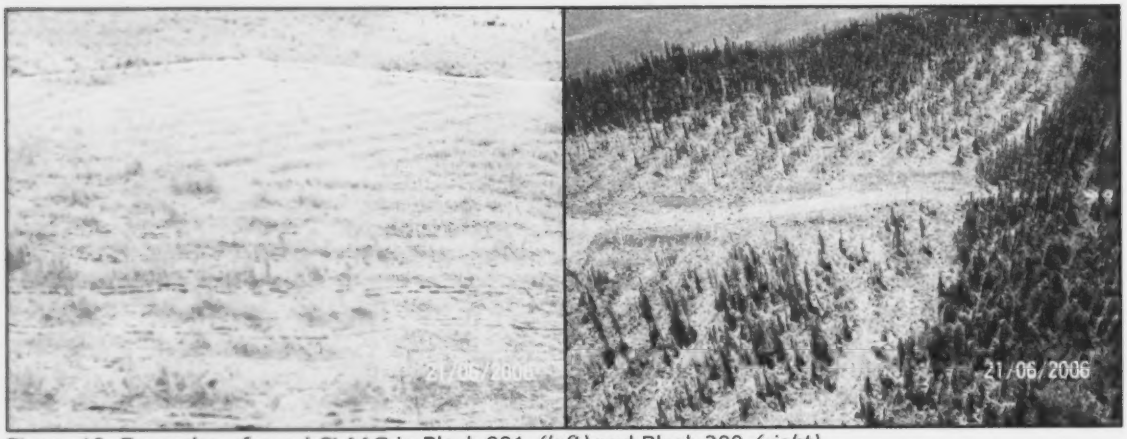

Figure 10. Examples of good CLAAG in Block 901 *(left)* and Block 200 *(right)*.

For older, artificially treated areas, and sometimes areas naturally regenerating to conifer, chemical release of conifer from hardwood competition was also a common prescription during the audit term. This was normally completed through aerial application of herbicide using, in the first few years, fixed-wing and later, rotary-wing aircraft. Where aerial spray was not the preferred option to reduce competition (mainly as a result of public and/or environmental concerns and/or due to small size/isolated location), various ground treatments were also used (e.g. basal bark spray, manual tending (brush saw with and without herbicide attachment), and ground tending (back pack spray)).

Renewal support during the term included establishing a jack pine testing site (Atigogama) and a black spruce seed orchard (Dragonfly). Both sites were viewed from a helicopter; a portion of the former appears to require tending (see top left corner of Figure 11). Renewal support also included production of spruce and pine seedlings and pine seed for aerial application. Most of the stock was produced at a local nursery (Dorion) and a nursery in Thunder Bay and stock was assessed by an independent stock testing contractor. Stock assessments determined that stock quality was quite variable during the term. In fact, stock quality assessment determined that about 170,000 red pine seedlings were not of sufficient quality to plant; this stock was destroyed. In the field, stock viewed was generally of good quality (Figure 12).

Most renewal and tending prescriptions completed during the audit term were consistent with the FMPs, AWSs and ARs. Field site 14, Block 500 was the exception, where selected naturally regenerating poplar and birch mixedwood stands were site prepared in preparation for planting. As noted earlier, this was a planned change in FOP for this area. This change should be appended to the AWS; however, this process has not been followed during the audit term. This is discussed in Section 3.3.11 and Recommendation 12 is given.

Figure 11. Atigogama jack pine testing site.

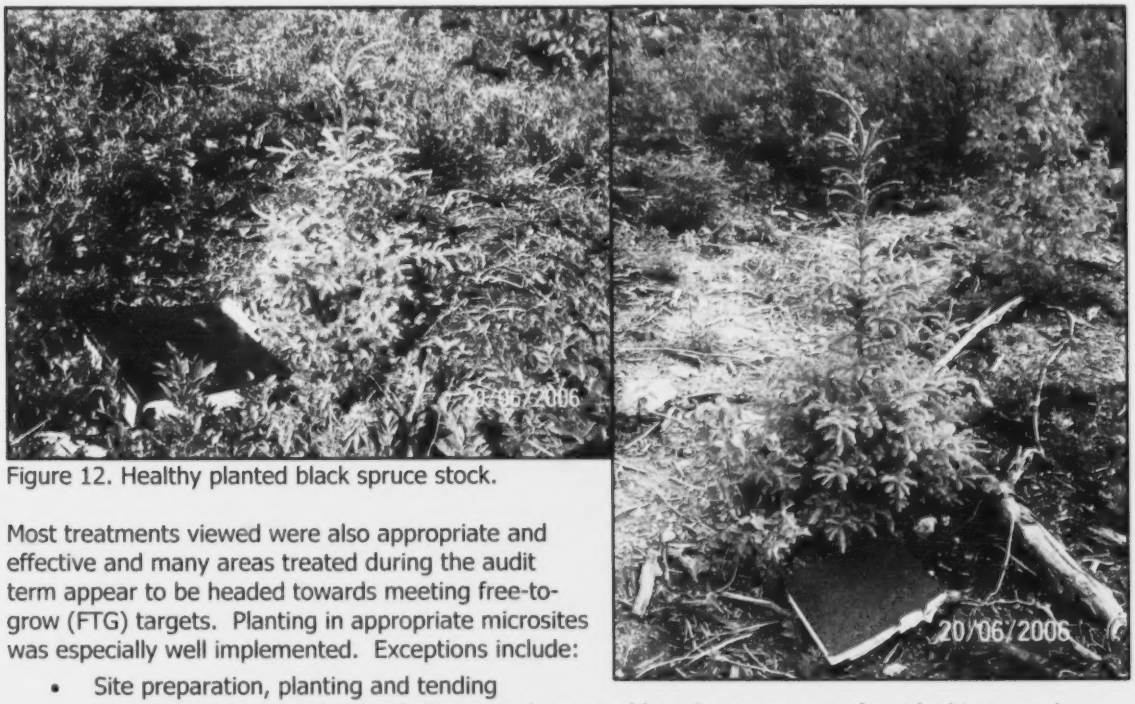

Figure 12. Healthy planted black spruce stock.

Most treatments viewed were also appropriate and effective and many areas treated during the audit term appear to be headed towards meeting free-to-grow (FTG) targets. Planting in appropriate microsites was especially well implemented. Exceptions include:

- Site preparation, planting and tending treatments on several upland sites were hampered by a large amount of residual trees and logging debris/downed woody debris;
- CLAAG prescriptions on some sites that had very little advanced growth (particularly Stop 10, Block 901) (Figure 13); and
- Some tending treatments that did not sufficiently reduce hardwood competition (e.g. Blocks 110, 803, 810).

The following paragraphs discuss these exceptions.

On most mixed wood stands viewed, maintenance of mature trees and logging debris reduced effectiveness of site preparation (i.e. less microsites provided) and sometimes reduced the effectiveness of tending treatments. In general, logging debris in the harvested area, along roads and associated with chip piles also reduced treatable area on all site types. The combination of these effects is reduced stocking in future stands, as planting of the full harvest area is not achieved and/or tending is not fully effective and needs to be re-done (i.e. first tending kills the overstorey and a second spray is needed). By and large, site potential is not being maximized. As a result, the audit team believes that Norampac should re-examine the artificial renewal program with regards to maximizing area available for immediate regeneration particularly in mixedwood stands or other stands that have a signi cant residual component.

Suggestion 11: Norampac Inc. should implement an artificial renewal program aimed at maximizing site potential and occupancy, particularly on mixedwood sites.

In the case of the CLAAG prescription applied to Block 901, there are some areas with little to no advanced growth. This was considered limited in scope as the area was small and all other CLAAG sites visited had abundant advanced growth and therefore the audit team does not believe that a recommendation is warranted; however, Norampac has a Careful Logging Implementation Manual, which indicates, among other things, that operators retain group seed trees on sites where there is insufficient advanced growth. According to the field sites viewed during the audit, this direction is apparently not being followed (Figure 13).

Suggestion 12: Norampac Inc. should make sure that harvest operators follow direction in the Careful Logging Implementation Manual, particularly when advance growth is sparse and seeding potential is low.

Figure 13. Block 901 CLAAG area with very little advance growth.

As noted, tending was not always effective and several aerial herbicide treatments viewed did not sufficiently reduce competition over the entire treatment area even one or two years following the treatment. Although there were several stands which were identified for re-treatment of herbicide, the contractor has never been required to re-apply treatment. Lack of formal post-spray assessments and contractual quality controls do not allow for the immediate detection and re-treatment of these areas (see Suggestion 15 in Section 3.6.1) (Figure 14).

Considering the increasing opposition to herbicide use from the public on the Lake Nipigon Forest, the desired future forest condition dominated by pure conifer stands, and the fact that Norampac would like to reduce the application of herbicide on the Forest, demonstrating effective and efficient herbicide use should be a company priority. This reality will not change until an environmentally-benign, economic alternative to herbicide is available. Alternatively, Norampac may decide that the forest composition objective in the 2006 FMP related to maintaining/increasing the conifer-dominated stands is not realistically achievable. Suggestion 14, Suggestion 15 and Recommendation 19 are made in Section 3.6 to aid in increasing the effectiveness and efficacy of the tending program.

Figure 14. *Left* White birch competing with planted black spruce seedling following spray on Block 810. *Right* Block 110, note the green vegetation on the left side of the photograph compared to the right side.

There does not appear to be a gap between planned renewal activities and actual activities completed in the field; however, there were a few exceptions:

- A portion of one block (Field Site 3, Block 200) scheduled for planting in 2005 was not planted until 2006 due to a lack of seedlings.
- There was a significant under-achievement of tending activities completed during the term (10,910 ha actual versus 19,430 ha planned (56%)). According to Norampac staff the shortfall is due to:
  - Only 130 ha of planned 1,000 ha of pre-commercial thinning was completed due to unsuitable site conditions;
  - 500 ha of pre-commercial poplar thinning planned was not completed; and
  - Several sites recently planted were deemed to not yet require tending.

Field observations did not indicate significant areas that require immediate treatment and the audit team concurs with Norampac's reasoning for under-achievement. Also, it was noted that Norampac has reduced the planned tending and thinning programs appropriately in the 2006-2011 FMP from the prior term.

There was one "non-compliance" related to renewal and tending operations during the audit term: in 2002, a skidder pulling barrels and chains was reported as crossing a creek.

In addition, there were a few in "compliance with comments" noted for the renewal and tending program during the 2001-2006 term:

- Following the 2002-2003 aerial tending program, it was discovered that there was over 1,500 litres of herbicide left over. Norampac completed several investigations of probable cause but a reason for this discrepancy was not found.
- Garbage was left on the ground following a tree plant operation in 2004.
- In 2004, some minor rutting occurred during site preparation activities.

Overall, compliance related to renewal and tending during the audit term was very good and Norampac has bolstered training when needed to reduce the chance of similar future occurrences. These efforts will likely have the desired effect.

3.4.6 Access

The development and use of aggregate pits is a vital component of forest road construction and maintenance. Aggregate pit development and use must abide by the Aggregate Resources Act[24] during periods of activity and must be properly decommissioned during periods of inactivity. While most Category 9 and 14 pits examined during the field portion of the audit followed the standards, a number did not, particularly in matters of decommissioning. Figure 15 provides examples of aggregate pits that require further decommissioning work. While Category 14 pits require no permits, Category 9 pits require permits issued by the MNR. Norampac is advised of the pit permits but is not responsible for aggregate extraction and compliance. Norampac is only responsible for the pits that it develops and maintains and, as the SFL holder, Norampac is also responsible to ensure that Category 14 pits are developed, used and decommissioned in accordance with the Aggregate Resources Act.

Pits that are decommissioned according to defined standards pose less of a safety hazard for the general public and are less intrusive aesthetically. With focus on the safety aspect, the audit team directs the following recommendation towards all pits that were inactive during the period of the audit.

Recommendation 14: The Ministry of Natural Resources and Norampac Inc. must ensure that all inactive aggregate pits are properly decommissioned.

[24] Aggregate Resources Act. R.S.O. 1990. c. A.8.

Figure 15. Aggregate pits that need decommissioning work on the Lake Nipigon Forest.

All roads examined by the audit team were placed according to the plan, or moved through amendments. Roads were properly built and maintained. Improvements and maintenance under agreement funding were verified against the invoices and found to be acceptable.

The audit team examined many stream crossings that were consistent with best practices and guidelines. The majority of crossings are located in a manner that reduces environmental impacts. There was one instance where grubbing occurred in the AOC (Block 110), but there were no negative effects to water quality in that case. Some excellent installations and improvements (e.g. Blair Lake Road and Devious Lake) were noted by the audit team.

An instance of road construction blocking drainage was found in a harvest block adjacent to the Blair Lake Road. Blocked drainages present a number of potential negative environmental impacts and have greater consequence in the area in question given its importance for cold water fisheries and potential ground water recharge zones. The audit team did not see sufficient evidence of blocked drainages to warrant a suggestion or recommendation but brings this example to the attention of Norampac for the record.

The vast majority of roads were properly constructed. There were several instances of excessive grubbing and over-building, and right-of-way (ROW) widths exceeded planned widths at two locations (e.g. Block 811). In addition, block roads could be located with greater care. Some approaches were too steep and required additional road length to achieve the required grade.

The audit team had questions about the Blair Lake Road, which traverses difficult terrain near Lake Superior and headwaters to streams that are important sport fisheries. The road is built to a high standard and avoids a 20-40 km back haul down an existing road network.

The planning documentation for this road was reviewed in detail and found to be very well presented. The alternatives (including no new road) are discussed in detail. All approval processes and public notice requirements were followed. Considerable care was taken in selecting a route to minimize impacts on streams and road construction practices were adjusted to minimize the impact on potential groundwater recharge areas.

The road building "foot print" appeared to be heavier than needed to haul the wood out cost effectively (Figure 16). Although the haul cost savings may be realized, this comes at a less tangible environmental cost.

Figure 16. Blair Lake Road: note the entire right of way had to be utilized to build the road bed due to the shallow site with little soil above bedrock.

This finding is a value judgment of the auditing team and in no way reflects negatively on the professionalism and diligence of the people involved with the project. Clearly, the planning team weighed the environmental risks and costs differently than the auditors might have, given similar circumstances. This is the art and essence of professional practice where different opinions do exist from time to time and form part of this necessary public debate within the context of sustainable forest management. Hence no recommendations follow from this investigation.

Several audit team members participated in the 1996 IFA of the Lake Nipigon Forest and noted considerable improvements in operations since 1996. However, considering the observations made on all roads in addition to the investigation of the Blair Lake Road, the following suggestion is offered.

Suggestion 13: Norampac Inc. should review its road building standards with the aim of reducing further the environmental impacts related to road construction, with the acknowledgement that considerable progress has occurred in the last decade.

3.5 Systems Support

3.5.1 Human Resources

According to the IFAPP there must be awareness programs which ensure that individuals responsible for implementing any part of the sustainable forest management system have current general knowledge of:

- regulations and legal responsibilities, particularly in relation to their direct responsibilities in sustainable forest management;
- sustainable forest management policies, objectives, and plans, including an understanding of how their own activities influence the successful implementation of the sustainable forest management system;
- contingency plans and corrective actions to be taken in the event of abnormal conditions, incidents, accidents and potential emergency situations;

- progress and accomplishments in implementing the sustainable forest management system; and,
- efforts to identify and incorporate suggestions for improving the sustainable forest management system.

Norampac ensures that the forest managers are Registered Professional Foresters in Ontario and supports the continuing education requirements of that designation by allowing employees to attend coordinated training opportunities as they arise. Personal training records are maintained by each employee and are on file at the office in Red Rock.

As mentioned in Section 3.1, Domtar has a comprehensive EMS program in place that promotes the communicating of relevant forest management policies and responsibilities, as well as the annual review of that material to incorporate changes and improvements. In addition to the EMS program training that Domtar staff and silvicultural contractors receive, the company also holds AWS meetings regularly throughout the year with each overlapping licensee and contractor, in relation to the amount and importance of work each is responsible for. This is an opportunity that is used to convey new information and requirements to those responsible for on-the-ground activities, review any training needs and conduct actual training exercises. MNR also regularly attends these meetings. AWS meeting agendas and notes are kept on file with each AWS year and a review of those documents indicated that the agendas are very comprehensive. Some of the topics covered in the agendas include:

- Ecosite 12– Full or Partial Stand Harvesting
- Unmapped Streams
- Marten Habitat Guidelines
- NDPEG
- AOCs and Values
- Stick Nests
- Road Maintenance
- Compliance Inspections
- Grading around Water Crossings
- Water Crossing Installation
- Protection of Sensitive Sites
- Bridge Removal

Apart from the AWS meetings, Norampac maintains an "arms-length" relationship in terms of training for overlapping licensees.

Discussions with Company staff indicate that employees are aware of their duties and appear dedicated to their work.

Interviews with MNR staff indicated that there has been no formal system in place to maintain employee training records for the majority of the audit period. It had been left to the individual to maintain their own training records. A review of those records indicated that employee training opportunities were related to their professional responsibilities. Currently, a Human Resource position has been established in the office and a system is now being implemented. The audit team also identified a lack of resources for compliance (see Section 3.6.1, Recommendation 16), GIS-NRVIS (see Section 3.3.5, Recommendation 7), and District Silviculture Effectiveness Monitoring (see Section 3.6.1, Recommendation 18).

Recommendation 15: Corporate Ministry of Natural Resources must review its priorities and allocation of human resources to deliver its forest management program.

3.5.2 Documentation and Quality Control

Documents were well organized and maintained in an efficient manner at the SFL manager's office in Red Rock. Domtar's EMS program is registered to the ISO 14001 standard and document control met the requirements of this standard. The audit team had access to all audit information.

Documentation at the Nipigon District MNR office was also maintained in an organized manner. All documents were made available to the audit team on request.

3.6 Monitoring

3.6.1 General Monitoring

The Company's general monitoring program has two elements; compliance monitoring and silvicultural monitoring.

Compliance Monitoring

On Crown lands, compliance monitoring of forestry activities is a joint responsibility of the SFL holder and MNR. For the Lake Nipigon Forest, compliance planning is led by Norampac, with assistance from the overlapping licensees. Each overlapping licensee has compliance responsibilities associated with the operations it conducts. The overlapping licensees are: Buchanan Forest Products Ltd. (BFPL), Domtar-White River, Red Rock Indian Band, Biinjitiwaabik Zaaging Anishinaabek, Animbiigoo Zaagi'igan Anishinaabek and Beardmore Forest Products. All silviculture operations compliance monitoring has been assigned to Norampac.

The certified compliance inspectors for the various licensees conduct inspections to identify compliance and non-compliance, and report to MNR. Where non-compliance is identified, corrective measures and future preventative measures to ensure improvement are specified. The role of MNR is focused on the regulatory aspects of forest management including monitoring, auditing of industry compliance inspections, assessing non-compliance significance, and determining corrective and enforcement action.

For the Lake Nipigon Forest, Norampac prepared a 2001-2006 Compliance Plan to coincide with the FMP term and included a Compliance Plan as Appendix AH to the 2006-2011 FMP. The 2001-2006 Compliance Plan was revised via amendment #36 (approved March 4, 2005) to address Norampac's oversight responsibilities and to clearly define the roles and responsibilities for "Qualified Overlapping Licensees" and "Non-Qualified (Other) Overlapping Licensees". Annual Compliance Plans were submitted as part of each Annual Work Schedule, with an Annual Schedule of Compliance Inspections included as an appendix thereto.

The Nipigon District MNR prepared a District Five-Year Compliance Strategy Report 1998-2003, as well as Annual Compliance Operations Plans. All of the documents were found to contain no risk analysis or discussion of human resources required to perform compliance operations. Further, no reviews were provided to ensure relevancy and continuity with objectives. No further District Compliance Plans were developed for the ensuing period as such plans are not required as of March 31, 2003.

In interviews, MNR staff expressed uncertainty that the District's compliance monitoring role would be filled. Staffing resources had been reduced with no indication that the vacant position(s) would be filled. Further, travel time to the northern part of the Nipigon Forest (3½ hours one way) makes compliance monitoring difficult. Finally, report production is time-consuming. In summary, the compliance reporting regime of the MNR seemingly includes little consideration of the realities of working in area offices and associated workloads. This is reflected in the failure to meet reporting deadlines. See Recommendation 16 below.

Norampac staff showed a good understanding of the compliance program and expressed dissatisfaction with the compliance reporting regime. For example, compliance monitoring by Domtar-White River, an overlapping licensee, on the construction of the Blair Lake Road was viewed by corporate MNR as unsatisfactory, although without non-compliances. The supervisor lived on-site in a trailer and kept detailed compliance related notes associated with road construction and water crossing installations while supervising the operations. Since the individual lived on-site and there was no internet communication linkage, compliance notes were not formalized and reported in the timelines required by the Forest Operations Compliance Program. Late report submissions were met with disapproval although the reports indicated compliance.

Neither MNR nor Norampac consistently met required reporting timelines for submission of Forest Operations Information Program (FOIP) reports (FOIP Procedure ENF 22.02.02). In spite of the introduction of the FOIRs where reports are exchanged electronically between industry and MNR, this situation has not improved.

Recommendation 16: The Ministry of Natural Resources and Norampac Inc. must ensure that timelines for reporting under the Forest Operations Inspection Program are met and that all inspections are reported as required.

Table 6 presents the number of compliance inspections completed by or on behalf of Norampac and by the MNR as well as non-compliances expressed in percentages. While the number and focus of inspections are good, an obvious discrepancy in non-compliance proportions exists. While 17% of the compliance inspections completed by or on behalf of the SFL holder were not in compliance, the level of non-compliance reported by the MNR was 58%. There are several reasons for this discrepancy. First, MNR is required to verify non-compliances reported by Norampac introducing systematic bias towards non-compliances in its reporting figures. The audit team noted that the MNR verification reports can now be easily tracked removing the bias. Second, the requirement for inspectors to be certified was established during the period under this audit. Third, many non-compliances discovered through a company inspection that can be readily remedied (e.g. picking up garbage or missed trees, unplugging a culvert) are corrected more or less on the spot. The audit team believes that compliance reporting inconsistencies will be reduced through the implementation of certified compliance inspectors for all compliance reporting requirements. The audit report has identified several areas of compliance that need attention. Sections 3.4.2 and 3.4.6 with Recommendation 13 and Recommendation 14 respectively address the findings. Overall, the audit team believes the Forest Operations Information Program as instituted on the Forest is satisfactory.

Table 6. Lake Nipigon Forest Compliance Report Summary (2001-2005).

Activity	SFL Total Reports	SFL Non-compliances (%)	MNR Total Reports	MNR Non-compliances (%)
Access	170	15	83	65
Harvest	157	25	70	47
Renewal	47	4	3	33
Maintenance (Tending)	29	0	0	0
Protection	0	0	0	0
Total Number of Inspection Reports Completed	403	17	156	58

Silviculture Monitoring

Note that rather than becoming overly prescriptive, the audit team provides a general recommendation at the end of this section that encompasses many of the items not otherwise covered by specific recommendations/suggestions herein. As such, Norampac should consider the entire discussion in this section when preparing an action plan for this recommendation.

Norampac's formal monitoring program for the Lake Nipigon Forest includes the following surveys:

- CLAAG and lowland stocking surveys completed on select stands;
- Silviculture effectiveness surveys of select natural conifer treatments;
- Planting quality and survival plots. The latter are re-assessed in year two and a sub-sample is re-assessed in year five;
- Post-treatment surveys of ground-tending (normally completed informally);
- Pre-tending assessments; and
- FTG surveys.

Norampac staff complete all assessments. Normally pre-tending assessments and FTG surveys are combined into operational blocks that Norampac staff assess by helicopter in the fall (usually in November after leaves have dropped). In the last year of the audit term, contractors were hired to complete a large FTG program (about 7,800 hectares) that included ground and aerial assessments.

As noted in Section 3.3.7 (see also Recommendation 8), the program for assessments of regeneration success in the 2001-2006 and 2006-2011 FMPs is too general; for example, "*Assessments will be conducted as part of the annual operations and will be performed according to the latest assessment guidelines and documentation.*" This text suggests that Norampac will use current assessment methodologies during the term. It was noted that, although available, new assessment methodologies were not adopted during the term. Specifically, the ground FTG procedure used in 2005 is largely based on the 1981 standard Regeneration Survey Manual for Ontario[25].

Nonetheless, FTG assessments completed during the term were generally good and it was noted that heights were conservative (Figure 17); however, in some cases it appears that hardwood components were underestimated. As noted, FTG assessments were completed by Norampac in November, during the leaf-off period. This may have caused the slight under-representation of hardwood species noted (completing surveys during the leaf-off period is discussed further below with regards to pre-tending surveys and a corresponding suggestion is provided).

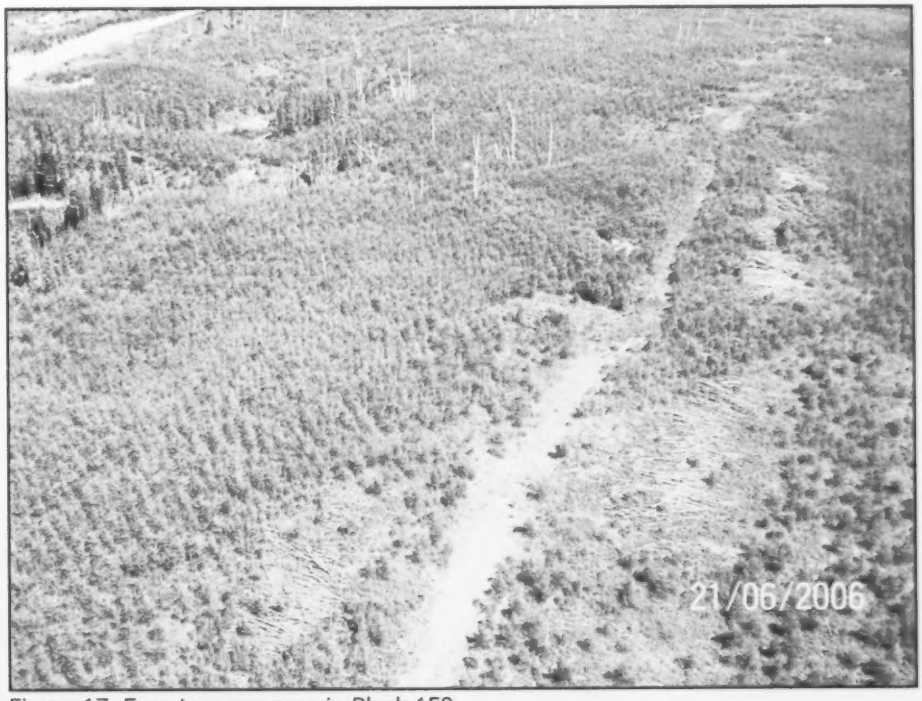

Figure 17. Free-to-grow area in Block 150.

According to the Trend Analysis Report produced by Norampac for this audit, FTG surveys were completed on 7,636 ha (76% of planned area) during the audit term. Of this area, 55% was deemed FTG. According to Norampac, most of the non-FTG area either requires a tending treatment to reduce hardwood component and/or requires more time to reach required height standards. Note that a large portion of the ground surveys completed in 2005 have not yet been entered into the geographic information system (GIS), nor have they been reported in the Trend Analysis Report; when this area is included, Norampac will have completed slightly more assessments than was originally forecast. The

[25] Chaudry, M.A. 1981. Regeneration Survey Manual for Ontario. OMNR, Toronto. 29 pp. + Appendices.

ground survey data is not due to be reported until the 2005-2006 annual report is due on November 15, 2006. However, the amount of assessment forecast and completed in the 2001-2006 period was not sufficient when compared to harvest levels from the previous two five-year periods. Fortunately, the 2006-2011 FMP forecasts over 31,000 ha of assessments to be completed during the 2006-2011 term. Completion of this program will reduce the current backlog of areas to be assessed. The audit team believes a recommendation directed at both MNR and Norampac is warranted. It will ensure that both auditees meet the FMP requirements and forecasted assessments of the 2006-2011 FMP. This topic is discussed in more detail in the review of the Trend Analysis Report (Section 3.7.3).

Recommendation 17: Norampac Inc. must ensure it meets the 2006-2011 FMP forecasts for silviculture assessments and the Ministry of Natural Resources must closely monitor Norampac Inc.'s progress in completing the forecast silviculture assessment program for the 2006-2011 term.

Although there has been a directive to the District Manager, training supplied and funding received since 2004, MNR have not completed silviculture effectiveness monitoring on the Lake Nipigon Forest to date. MNR staff has provided several reasons for this deficiency, but the audit team notes that other Districts with similar issues have made significant progress in completing silviculture effectiveness monitoring in the past few years. In addition, the audit team reminds MNR that one cost-effective measure to complete silviculture effectiveness monitoring is to accompany Norampac staff and/or contractors during aerial FTG surveys.

Recommendation 18: The Ministry of Natural Resources must complete silviculture effectiveness monitoring on the Lake Nipigon Forest.

Note that this recommendation encompasses the area described in the prior suggestion, but should not be limited to those forecast activities. Silviculture effectiveness is about understanding the effectiveness of individual treatments on different sites and should not be limited solely to FTG surveys.

As discussed in the renewal section, herbicide treatments conducted during the audit term were not always effective. For aerial tending projects, one possible cause may be under-estimation of competitiveness of sites during pre-tending assessments, which are normally completed in the leaf-off period.

Suggestion 14. Norampac Inc. should consider completing aerial pre-tending and free-to-grow assessments during or near the end of the leaf-on period.

Although Norampac has demonstrated judicial use of herbicide during the audit term, the audit team questions whether ground surveys may be more appropriate for some stands to confirm the effect of competition on conifer trees (e.g. determine rooting competition, gauge terminal growth and view damage such as whipping). The audit team believes that a suggestion is not warranted in this case and provides this information for Norampac's consideration.

Post-tending surveys to confirm project effectiveness are not formally completed by Norampac. Although contracts for ground tending projects contain formal assessment specifications (except the basal bark contract), Norampac completes only informal surveys. For aerial tending, no formal assessments are conducted and there are no contractual quality assurances. Therefore, sub-par treatments may not be identified until stands are surveyed for FTG status (which may be several years after herbicide treatment).

Suggestion 15: Norampac Inc. should formalize assessments of aerial tending projects, add quality control stipulations to aerial tending contracts and complete formal surveys of ground tending projects, as per contract specifications.

The auditors are aware of several forest companies that monitor aerial herbicide effectiveness through use of remote sensing products and other means and have quality assurances built into contracts. Normally, when the treatment is not effective, the contractor re-applies in the following year.

As discussed in the opening paragraph of this section, the audit team makes the following general recommendation.

Recommendation 19: Norampac Inc. must make certain that the monitoring assessment program is adequate for assessing the effectiveness of all silviculture treatments.

3.6.2 Annual Report

Preparation of annual reports is an integral part of adaptive management. Annual report content was in accordance with requirements of the 1996 FMPM and the phase-in requirements of the 2004 FMPM. Annual report text provided good summaries of operations on the Forest during the year. A discussion on the late submission of annual reports is included in Section 3.8.

The audit team found strong evidence that the findings of the 2001 IFA were incorporated into forest management planning and operations. For example, the productive forest area was reflected accurately in the 2006-2011 FMP; the training of overlapping license holders was more comprehensive; and the audit team observed improved installations of water crossings and implementation of AOC prescriptions. A comprehensive review of the status of the 2001 IFA recommendation is given in Section 3.8 of the audit report.

The recommendations from the 2001 IFA report were summarized in the RPFO and the action plan status report was referenced in the RPFO as required.

The MNR is also required under Condition 34 of the Class EA Declaration Order to report on negotiation with Aboriginal communities. The Condition 34 (formerly Term & Condition 77) report was produced for the years 2001-2002, 2002-2003, 2003-2004 and 2004-2005. The reports were thorough and provided adequate detail regarding negotiations and opportunities with four of the five relevant First Nation communities. Pays Plat First Nation was not mentioned in any of the annual Condition 34 reports (see Section 3.8 and Recommendation 26).

3.6.3 Report of Past Forest Operations

The Draft 1996-2001 Report of Past Forest Operations (RPFO) was submitted approximately one year behind schedule. It was made available to the LCC for review in early 2004 and feedback was encouraged. According to the 1996 FMPM, the final revised RPFO is to be available to the public at the First Information Centre for the 2006-2011 FMP, in this case in about the fall of 2004. However, the final RPFO was not even submitted to MNR until January of 2006, significantly behind schedule. The 2004 FMPM no longer requires the development of an RPFO; it has been replaced by the Year-Ten Annual Report which Norampac is required to produce by November 15, 2006 for the 2001-2006 FMP.

Recommendation 20: The Ministry of Natural Resources and Norampac Inc. must ensure that the Year-Ten Annual Report for the 2001-2006 Forest Management Plan will be produced, reviewed and accepted according to the schedule provided in the Forest Management Planning Manual.

The RPFO for the 1996-2001 term was a combined report for the Auden and Lake Nipigon Forests, as well as the Townships of Kitto and Kilkenny Townships. While all areas are included in the same report, they are presented and discussed separately. All of these areas were subsequently amalgamated into the present Lake Nipigon Forest. Discussion has also been provided for the first two years of the 2001-2006 FMP. Although the final version of the RPFO was late the report was available in its draft form for the production of the 2006-2011 FMP.

The discussion of activities and level of achievement on the Forest are covered in the text and tables. The analysis of variance from the plan and discussion of root causes is adequate; however, meaningful conclusions and recommendations are not made. For instance, there is a discussion with respect to the 2001 "snowdown" that concludes "particular challenges will be encountered with modeling the changes caused by the storm in areas where the storm was not stand-replacing...". Those challenges are not identified nor are any recommendations made.

One of the requirements of the RPFO is to discuss the achievement of objectives from the plan. The 1996-2001 RPFO includes a discussion regarding the drawing of conclusions based on a five-year window particularly for forest diversity and cover. The text provides good discussion based on the objectives in the plan but like other areas of the report is weak with respect to providing sufficient information for setting objectives and strategies in future plans.

The audit team also investigated the degree to which the conclusions and recommendations of the 1996-2001 Annual Reports were considered in the production of the current FMP. There is evidence that many of the issues such as local employment, caribou mosaic, competing interests and inventory and modeling were included in the 2001-2006 FMP as well as the current FMP.

The RPFO is also required to evaluate the changes to the socio-economic profile and determine if the implementation of the FMP influenced these changes. Given the fact that the FMP being reported on was produced prior to the implementation of the 1996 FMPM there was no socio-economic profile done. However, the discussion on integrated resource management is well done and covers the requirement to the extent possible.

A summary of recommendations that should be considered in the development of the next FMP have been included in the final section of the RPFO. In future reports recommendations and suggestions should be included as part of the text in the main body of the report. This permits the reader to understand the context leading up to each suggestion or recommendation.

Suggestion 16: Norampac Inc. should ensure that the conclusions and recommendations in the Year-Ten Annual Report for the 2001-2006 Forest Management Plan are clearly identified within the text and summaries.

3.7 Achievement of Management Objectives and Forest Sustainability

3.7.1 Achievement of Management Objectives

1996-2001 FMP Objectives

As noted previously, the former Auden and Lake Nipigon Forests and portions of the former Nipigon Crown, Steel River Crown and Onaman Management Units amalgamated in 2001 to become the current Lake Nipigon Forest. The audit team reviewed the assessment of management objectives for the former Lake Nipigon and Auden Forests for the 1996-2001 term. A list of the objectives and audit team assessment of the achievement of each objective is provided in Table 7 and Table 8 respectively. The comments column provides the explanation for the audit team's opinion of overall objective achievement.

Table 7. Summary of the status of the 1996-2001 Lake Nipigon Forest Timber Management Plan management objectives (see Timber Management Plan for full version).

Objective/Target	Achieved Yes/No/ Partial	Comments
Sustained Yield		
To ensure that the Lake Nipigon Forest is managed to produce a continuous and predictable supply of quality wood fibre to meet the needs of the Domtar linerboard mill in Red Rock, and quality hardwood fibre to the various hardwood utilizing facilities in the area.	Partial	Actual softwood utilization was 81% of planned. The wood fibre needs of the Red Rock mill were met through exchange of sawlogs, chips and sawdust with Great West Timber in Thunder Bay. Hardwood utilization was well below forecast (41%). The Appendix E hardwood commitments were not met, primarily due to limited hardwood markets.
Integrated Resource Management		
To ensure the planning, co-ordination and implementation of forest management activities provide both short- and long-term benefits while minimizing conflicts with other programs and resource users.	Yes	Increased level of harvest activities by First Nations. Continued consultation with First Nations. Involved the LCC in the production of the FMP and continued to participate on the LCC. Fifty percent of the work force is local with another 40% coming from the Thunder Bay areas. Continued consultation with interest groups and individuals on the forest.
Environmental Protection		
To ensure that forest management activities are planned, coordinated and implemented utilizing established environmentally sound practices, in order to minimize negative impacts and to maintain the quality of the environment.	Yes	A lack of critical fish habitat was addressed by assigning all unknown fisheries to "reserve status" AOC-FU. Woodland caribou (Figure 18) were identified as a featured species in the area north of the caribou line on the majority of the former Auden Forest. A compliance plan and an Annual Schedule of Compliance Inspections were followed. Company Compliance records show 14 non-compliances (5%) out of a total of 263 inspections which is a reasonable level in the opinion of the audit team.

The 2001 IFA report clearly addresses the lack of a strong hardwood market and limited utilization of the hardwood resource on the Lake Nipigon Forest. The audit team found this to be a continuing problem in the current audit period. This is addressed with Recommendation 22 in Section 3.8 of this audit report, which concludes by encouraging MNR to review the entire Appendix E Wood Supply Commitments approach. For the 1996-2001 term, a continuing effort by Norampac and MNR to meet the objectives was evident from the reports, data, field trip observations of practices from that period, and discussions the audit team experienced.

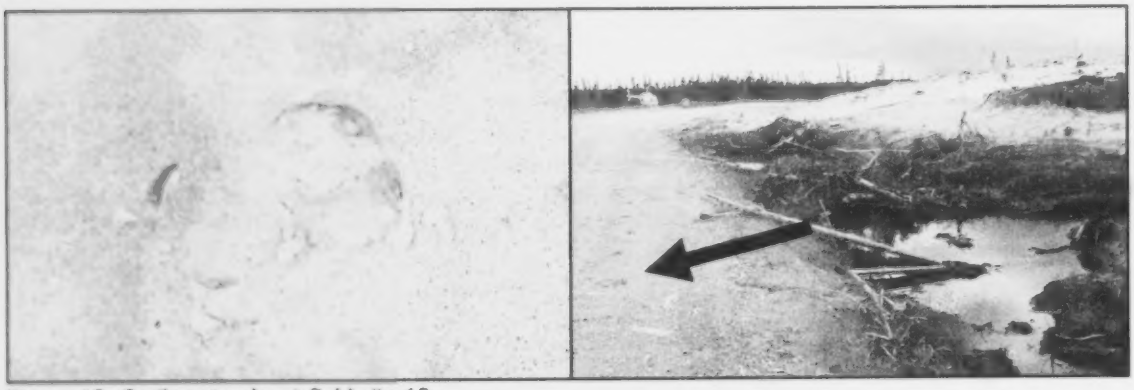

Figure 18. Caribou tracks at field site 10.

Table 8. Summary of the status of the 1997-2002 Auden Forest Timber Management Plan management objectives (see Timber Management Plan for full version).*

Objective/Target	Achieved Yes/No/ Partial	Comments
Sustained Yield		
To ensure that the Auden Forest is managed to produce a continuous and predictable supply of quality wood fibre to meet the needs of the Domtar linerboard mill in Red Rock, and quality hardwood fibre to the various hardwood utilizing facilities in the area.	Yes	The Red Rock mill needs were met through an exchange of sawlogs and pulp for chips and sawdust from Northern Sawmills. BFPL carried out the entire harvest, achieving 67% of the conifer target and 45% of the hardwood target. Buchanan Northern Hardwood Inc. received 99% of the hardwood harvested.
Integrated Resource Management		
To ensure the planning, co-ordination and implementation of forest management activities provide both short- and long-term benefits while minimizing conflicts with other programs and resource users.	Yes	No quantitative targets set. A diverse group of users were considered including First Nations, community needs, socio-economic concerns and wood consumption. A good rapport with the public and other resource users was maintained.
Environmental Protection		
To ensure that forest management activities are planned, coordinated and implemented utilizing established environmentally sound practices, in order to minimize negative impacts and to maintain the quality of the environment.	Yes	Plan production and implementation followed applicable legislation and guidelines. Overall deficit in renewal related to reduced harvest levels and the timing of the harvests- substantial areas were harvested in the last two years which were treated in 2002 and 2003. No quantitative targets set.

* Note that the Auden Forest was amalgamated with the former Lake Nipigon Forest in 2001, effectively reducing the term of the plan to four years.

Overall objectives were met. The 2001 IFA identified shortcomings, many of which were incorporated or addressed in the development of the 2006-2011 FMP. The most significant finding identified the fact that no natural regeneration was declared for the 1986 to 1996 period, creating a large amount of backlog area in the Barren and Scattered (B&S) category. The audit team noted that the 1995 inventory was to identify areas requiring renewal treatments and/or natural regeneration reporting, but the new inventory was not incorporated until the 2006-2011 FMP. The significant decrease in the level of B&S from 2001 to 2006 reflects that change.

2001-2006 FMP Objectives

Table 9 provides a list of the objectives for the 2001-2006 FMP, which is the subject of the audit. The audit team has provided a review of the progress towards meeting the objectives by indicating whether the objectives were met, not met or partially achieved. Associated recommendations and suggestions are identified if applicable in the centre column.

Of the 17 objectives/targets listed, two of the objectives are shown as being only partially achieved. First, the Appendix E wood supply commitments have not been fully met (Recommendation 22). Second, several recommendations and suggestions are provided to improve harvesting and silviculture activities related to enhancing productivity. However, overall the Forest is being managed in an environmentally sound manner by the Company.

Table 9. Summary of the status of the 2001-2006 Lake Nipigon Forest FMP management objectives (see FMP for full version).

Objective/Target	Achieved: Yes/No/Partial & Recommendation/ Suggestion	Comments
Forest Diversity		
To maintain forest diversity within the bounds of natural variation.	Yes	The selected management alternative is keeping the development of the Forest within the bounds of natural variation. Disturbance pattern is not moving towards the template as originally forecast due to the number of smaller disturbances created by the "snowdown" and the related salvage operations.
To protect and/or enhance landscape processes which affect the structure, composition and function of forest ecosystems through minimizing adverse effects on terrestrial and aquatic ecosystems.	Yes Suggestion 10, Recommendation 13, and Recommendation 16	The Plan includes a list of MNR implementation manuals that were used in its preparation. Numerous AOC prescriptions are included in the FMP to provide protection for known values. A compliance program is in place, water installations are being upgraded, and new unmapped streams are protected as encountered.
Provision of Forest Cover		
To protect and maintain heron rookeries and nesting sites for bald/golden eagle and osprey.	Yes	All rookery and known nesting sites for eagles and ospreys were identified on the values map and AOC prescriptions applied. One minor trespass into a no-cut zone was dealt with appropriately and the integrity of the value was not compromised.
To ensure a suitable and sustainable landscape containing adequate year-round caribou habitat north of the caribou line.	Yes	Spatial habitat analysis conducted as well as two non-spatial habitat analyses with specific targets met. Considerable effort and work done to address caribou habitat needs but concerns continue to be raised. Changes made in the 2006 FMP driven by new sources of information. Year-round caribou habitat addressed in FMP. Known caribou sensitive sites protected.
To maintain in suitable conditions, forest which has the capability to produce marten habitat.	Yes	Adequate amount of marten habitat in place at start and end of audit period considering forest condition. Forecasts indicate increases in core areas.
To ensure that moose habitat is maintained or enhanced.	Yes	Moose habitat adequately represented on the Forest.
To ensure the protection and maintenance of water quality and habitat for fisheries resources within watersheds where forest management activities occur.	Yes	AOC prescriptions identified and protected fish habitat and water quality. Water crossing installations generally well done. Where fishery values are unknown (FU), cold water AOCs (FC) are applied - consistent with precautionary principle.

Continues on next page.

Table 9 continued.

Objective/Target	Achieved: Yes/No/Partial & Recommendation/ Suggestion	Comments
Socio and Economic Matters		
To ensure that the Forest is managed in an environmentally sound manner to provide a sustainable, economical and predictable supply of quality wood fibre to user mills sourcing fibre from the Forest.	Partial Suggestion 17, Recommendation 22, Recommendation 23	Not all the Wood Supply Commitments in Appendix E were met.
To achieve participation by local Native communities in the benefits provided through forest management planning and activities.	Yes	Four First Nations chose to participate in the formal Native Consultation Program as well as additional meetings and liaison. Three First Nations (Red Rock Indian Band, Biinjitiwaabik Zaaging Anishinaabek and Animbiigoo Zaagi'igan Anishinaabek) were actively involved in commercial harvesting and met 92%, 56% and 300% respectively of their commitments in the first 4 years.
	Recommendation 26	While there are three First Nations deriving economic benefit from the Forest, Pays Plat First Nation has yet to receive any.
	Best Practice 1	Table 17 in this report provides an indication of the benefits the Aboriginal communities derived from the Forest through their participation (expressed in percent) in forest management activities.
To maintain and protect Native cultural heritage values.	Yes Suggestion 2	Report on the Protection of Identified Native Values provided by the Company. Assessment of High Potential Cultural and Heritage Values within allocations completed and AOCs prepared for those values.
To maintain and protect archaeological sites, cultural landscapes and traditional use sites (non-Native).	Yes Suggestion 2	No unknown cultural values were discovered during audit period.
To encourage opportunities for local employment in a range of forest management related activities (harvest, renewal, maintenance, log hauling, road construction, processing at local mills etc.) as well as in the service and supply sectors which support these activities.	Yes Best Practice 1	Local employment numbers are documented in the RPFO for the first three years of the audit period with 30 to 50% of BFPL - Jellicoe Division originating from the Forest area. Beardmore Forest Product's work force continued to be comprised of 75% local residents. Table 17 in the audit report provides an indication of the benefits the Aboriginal communities derived from the Forest through their participation (expressed in percentages) in forest management activities.

Continues on next page.

Table 9 continued.

Objective/Target	Achieved: Yes/No/Partial & Recommendation/ Suggestion	Comments
To ensure that forest management activities are planned and implemented in a manner in which opportunities for commercial tourism activities can be sustained.	Yes	Detailed AOC prescriptions were developed as part of the FMP. A high degree of compliance to these prescriptions, monitoring and communications ensures effectiveness. In some cases prescriptions were developed but parties were unsure of effectiveness. Monitoring during the operation provided information that was used in the 2006 FMP to improve prescription. Instances where the prescription was followed but results were other than expected were also used to improve future prescriptions.
To ensure that forest management activities are planned and implemented in a manner in which Crown and recreational opportunities (i.e., hunting, fishing, canoeing, camping, etc.) can be sustained.	Yes	No direct negative feedback received. Road planning described benefits of roads to these groups. AOCs for known values applied to ensure protection (canoe routes, viewshed).
To provide volumes of timber for such uses as fuelwood, building logs and other local or personal uses.	Yes Recommendation 26	Demand for personal use timber met throughout audit period by identifying a number of stands as fuelwood areas.
Silviculture		
To optimize forest renewal and tending and maintain /enhance the long-term productivity of the forest in an environmentally sound manner.	Yes	The forest is being managed in a sustainable manner when the area successfully regenerated is compared to the area harvested (i.e. renewal is in balance with harvest), but a significant amount of forecasted FTG assessments needs to be completed in the 2006-2011 term.
	Partial Suggestion 11, Suggestion 12, Suggestion 13 Recommendation 13, Recommendation 17, Recommendation 18, Recommendation 19, Recommendation 21	While all FTG sites visited easily exceeded the 40% minimum and likely maintained or enhanced stocking/volume from the original stand, it was not always apparent in the field that renewal completed during the audit term would meet the minimum stocking or maintain/enhance long-term productivity (e.g. for SPM must, on average, have 66% or more stocking). This was particularly evident on most mixedwood sites where large numbers of residual trees hampered treatments. In general, logging debris in the bush, along roads and associated with chip piles also reduced treatable area on all site types. The declining yields from the forest are a concern (i.e. yields have declined from 113 m^3/ha in 1991-1996 to 76.67m^3/ha in 2001-2006). Some of the decline can be attributed to the underutilization of hardwood volumes and the lower volumes realized from the salvage harvests.

3.7.2 Review of RPFO Assessment of Sustainability

An RPFO is to be produced after an FMP has been implemented. The audit team examined the 1996-2001 RPFO, which summarized the actual operations that were carried out during that plan period. The 1996-2001 RPFO was also to contain an Assessment of Forest Sustainability that was to be written in accordance with the requirements of the FMPM that applied at the time of the plan production (Phase-in requirements from Appendix VIII of the 1996 FMPM).

As noted previously, the former Auden and Lake Nipigon Forests and portions of the former Nipigon Crown, Steel River Crown and Onaman Management Units amalgamated in 2001 to become the current Lake Nipigon Forest. The trends discussed in the RPFO referred to the post-amalgamated Lake Nipigon Forest.

The Company is to provide an assessment of the success of the plan in achieving forest sustainability through an examination of indicators of forest sustainability criteria and an analysis of changes to the forest condition and the socioeconomic condition. However, not all the indicators of sustainability can be assessed since the information is lacking for the 1996-2001 and the 1997-2001 FMPs, which were considered "deemed forest management plans" despite being written primarily in the format described in the Timber Management Planning Manual for Crown Lands in Ontario[26].

According to the 1996 FMPM Appendix VIII: "*Planning teams should use the best information and knowledge available to provide a description of the changes in the forest condition over the five-year term... required to produce RPFO-14 and, where specific data is readily available, RPFO-19".* The 1996-2001 RPFO contains both of these tables and provides an excellent and thorough historical background to the development of the current forest condition on the Lake Nipigon Forest. In addition, a text description of the changes in forest condition during the 1996-2001 (Lake Nipigon Forest) and 1997-2001 (Auden Forest) plan period is provided.

A limited discussion regarding current forest condition versus desired condition is available in this RPFO as much of the framework for forming the basis of assessment had not been established when the 1996-2001 and 1997-2001 FMPs were written. The discussion is limited to two of the six indicators of forest sustainability: "changes in managed crown forest available for timber production" (RPFO-14) and "frequency distribution of disturbance sizes" (RPFO-19).

RPFO-14 shows a steady decline of managed forest land base through time. The reason for this is "*Projected decreases in the predicted managed crown forest available for timber production over time are the result of the application of "accumulating reserves" and the conversion of harvested areas to non-forest land (i.e. roads and landings)".* Accumulating reserves were applied at a rate of about 11%. Changes in managed Crown forest available is further discussed in Section 3.7.3 of the audit report (see land base review).

The RPFO notes the effects of limited logging and fire suppression on the age-class distribution of the Forest (i.e., the period with limited logging activity and increased fire suppression activity approximately 20-25 years ago created a lack of younger forest and an abundance of older forest). This is common to many of Ontario's boreal forests and is sometimes called an "age-class gap". It is not until logging activity on the Forest increased that young regenerating forest (zero to ten years old) began to approach predicted historic levels. The age-class gap as depicted in Figure 19 (from about ten to 55 years old) affects many of the strategies and decisions in forest management planning.

Table RPFO-19 and related text and graphs describe movement of disturbance sizes towards the natural template. On average, frequency distribution of clearcut and wildfire sizes is moving towards the emulation of natural disturbance frequency and size class as patches are becoming slightly larger. The

[26] MNR. 1986. Timber Management Planning Manual for Crown Lands in Ontario. Queen's Printer for Ontario. 164 pp. + Appendices.

relatively larger harvest areas under the application of the Interim Woodland Caribou Habitat Management Direction[27] during the 1996-2001 term when compared to smaller harvest areas under the application of the Timber Management Guidelines for the Provision for Moose Habitat[28] during the prior terms is a contributing factor in emulating natural disturbances (i.e. wildfire historically burns larger areas less frequently). In addition, the RPFO adds the following: "*As a result of revisions to forest unit definitions over successive plan terms and a reduction in the landbase due to the Ontario Lands for Life (OLL) initiative it is difficult to derive forest structure trend information at the forest unit and age class level*". Nonetheless, the audit team notes that more information regarding changes in the main forest units could have been included in the RPFO but makes no recommendation herein as Norampac is required to address similar information in the forthcoming Year-Ten Annual Report for the Lake Nipigon Forest.

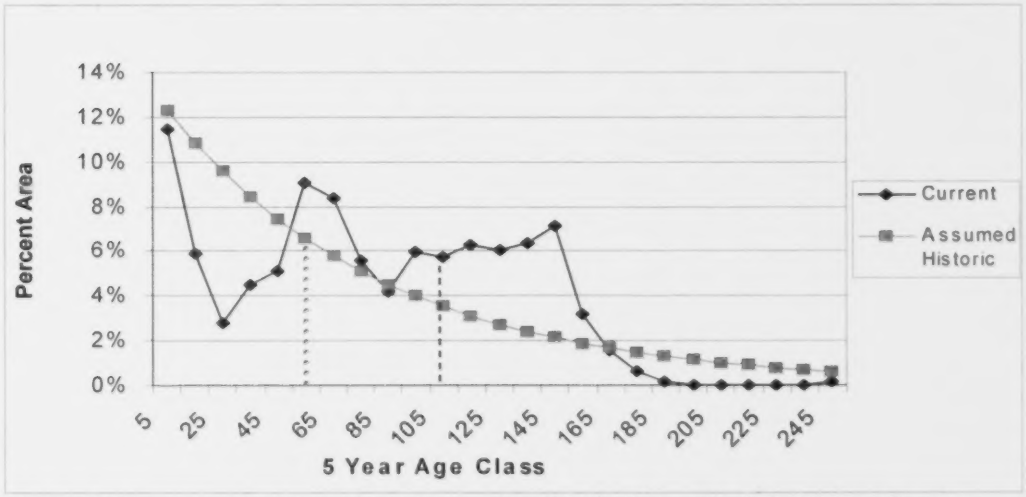

Figure 19. Current and assumed historic age-class distribution on the Lake Nipigon Forest. (Source: 1996-2001 RPFO.)

The 1996-2001 Lake Nipigon Forest RPFO contains no information regarding silvicultural effectiveness. In its place, achievement of specific renewal activities is restated in a table and the following general statements are made under the strategies section: "*The renewal strategy in the 1996-2016 and 1997-2017 FMP's was implemented with relative success*" and "*The tending strategy in the Lake Nipigon Forest 1996-2016 and Auden Forest FMP's was successful at suppressing hardwood and herbaceous competition on specific plantations until conifer dominates the site*".

Although the information provided does answer the first suggested question regarding achievement of silviculture objectives in section 4.4 of the 1996 FMPM "*were the planned renewals undertaken?*" and partially answers the second question "*did renewal treatments produce the anticipated results?*", the important questions regarding how the prescriptions fared and how the forest developed (i.e. silviculture effectiveness) were not answered.

Some general silviculture issues are also discussed, including: reduction of the former balsam fir working group through artificial renewal treatments and retention of individual red and white pine trees to protect genetic heritage and provide seed source.

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[27] MNR. 1994. Draft Management Guidelines for Woodland Caribou Habitat. OMNR Northwest Region, August 1994. Recommendations of the NWR Caribou Task Team on behalf of Policy and Program Division. 17 pp. + Appendix.

[28] MNR. 1988. Timber Management Guidelines for the Provision of Moose Habitat. Queen's Printer for Ontario. 10 pp. + Appendices.

Again, as similar text and tables are necessary in the 2005-2006 Annual Report (which will be needed to fulfill the Year-Ten Annual Report reporting requirements according to the 2004 FMPM), no recommendation is made herein. Rather, the audit team reminds Norampac to make certain all required information is presented in the Year-Ten Annual Report.

3.7.3 Review of the Lake Nipigon Forest Comparison and Trend Analysis of Planned vs. Actual Forest Operations

The Comparison and Trend Analysis of Planned vs. Actual Forest Operations Report (Trend Analysis Report) was submitted in time and met the requirements of the IFAPP. Some minor corrections were required to ensure the data matched the source documents and the revisions were completed satisfactorily by Norampac.

As explained in the previous section and in other sections in this report, the current Lake Nipigon Forest is an amalgamation of former forests, Crown Management Units and two townships. Because of the varying reporting periods for these former management areas, differing responsibilities (i.e. some of the data is derived from MNR records whereas the remaining data comes from the Company) and the amalgamations of different areas over different time periods, many of the Trend Analysis Report tables report on an annualized basis. The above factors when combined with the use of the 1995 FRI for the first time in the development of the 2006-2011 FMP, as well as differences in direction from the MNR for reporting of forest types, is discussed below.

Land Base

A detailed explanation of the land base changes and the rationale for those changes is included in the Trend Analysis Report and will not be repeated here (see Appendix A of this IFA report). The most significant land base difference is the inclusion of 111,217 ha in the depleted category, and 14,850 ha in the B&S category (126,067 ha in total) in the 2006-2011 term in Table 1 (Summary of Total Area under Management), in the Trend Analysis Report that was not reported in the same table in the 2001-2006 FMP. As outlined in the Trend Analysis Report, the inclusion is due to the MNR NW Region's direction to the 2001-2006 FMP planning team that all B&S and depleted areas in the FRI were to be classified in SFMM as "available forest" (predominantly in the 1-10 and 11-20 age classes); and that the landbase FMP tables had to match SFMM. Based on the 2001 IFA recommendation that the available forest area in the landbase FMP tables should more closely reflect the actual condition of the Forest at the beginning of the planning term, and the revised MNR NW Regional direction to the 2006-2011 FMP planning team, the 2006-2011 FMP landbase tables show the area in B&S and depleted from the FRI updated to 2006. Therefore the audit team believes this issue has been addressed and no recommendation is required.

The combined total area of Depleted and B&S (126,067 ha) is far too high - about 17% of the production forest. This represents about 4.5 planning terms or 23 years of harvest when compared to the average five-year harvest of approximately 27,000 ha. The audit team determined that this was an unreasonable amount of area in these classifications and required an explanation. The audit team investigated further and received the following breakdown from the Company - of the 126,067 ha there is 14,850 ha that is considered "true" B&S according to the FRI update (area that will always be B&S due to terrain conditions, etc.). Of the remaining 111,217 ha:

- 72% is currently less than ten years old natural or artificial regeneration treatments and therefore cannot be or has not been assessed for FTG. Note that Norampac determined that the average time to FTG on the Forest is nine years;
- 12% is the portion of the Nipigon 12 wildfire (burned approximately 30,000 ha in April 1999) that was not salvage harvested and is a natural depletion that does not get picked up as FTG in the regular FTG program (it gets back into the landbase and out of "depleted" through FRI updating).

Of the remaining 16% of the area:

- Approximately 3% has been recently surveyed for FTG (and will be determined based on what has been declared FTG as part of the 2005 FTG summary).
- Another 3% is considered as class Z lands under the terms of the SFL (the Action Plan Status Report from the 2001 IFA provides the actions being taken to deal with these lands).

This leaves approximately 10% of older harvest depleted areas that have not been surveyed or was surveyed prior to 2002 and was not yet declared FTG (the Company has only recently tracked 'area surveyed but not declared FTG in the GIS).

At first glance, a recommendation would be warranted given the large area in the depleted category but based on the foregoing information and based on what the audit team has viewed and discussed with the Company and Ministry, the audit team believes no recommendation is needed. Refer to the discussion under the sub-heading *Free-to-Grow Assessments* later in this section and Section 3.6.1.

To conclude, in spite of some shifts in areas occupied by major land types, the changes in reporting of depleted and B&S during the 2001-2006 term, changes associated with the use of a digital database, and the re-classification of seven conservation reserves totaling 60,700 ha, the overall production forest classification on the Lake Nipigon Forest increased only 3.6% (26,590 ha) from 1991 to 2006. The most significant change in the working groups is the shift in the balsam fir working group to the spruce working group mainly as a result of the spruce budworm infestation that began in the late 1980s.

Forest Units

The Trend Analysis Report provides a detailed review of the transition over a 20-year period from forest units defined essentially by working groups in 1991 to the more ecologically based forest units used in the 2006-2011 Lake Nipigon Forest FMP. The audit team believes the most recent classification is appropriate and reflects the Forest types and conditions in a suitable manner.

Harvest Activities

The Trend Analysis Report provides a very thorough review of the differences between planned versus actual forest management activities for the past three planning terms. The reader is referred to the Trend Analysis Report, which is included as Appendix A of this report. The audit report will highlight some of the key factors which the audit team believes contributed to the differences between planned harvest, renewal and FTG assessments versus actual activities completed, based on audit observations and interviews.

Table 10 provides the percentage of planned versus actual forest management activities achieved on the forest in three planning periods. As noted, the data for the 1991-1996 and 1996-2001 planning terms is a summary for the two separate forests (pre-amalgamation), annualized and then multiplied by five for each term.

The achievement of actual to planned harvest volumes over the 15-year term at 63% was relatively in proportion to the achievement of planned versus actual area for the same period at 72%. As indicated in the Trend Analysis Report, the reasons for the lower actual harvest volumes and areas are multifold but include the underutilization of the hardwood volumes, limited hardwood markets and lower than expected volumes from the salvage harvests. This may in part explain the decrease in the average yield from the Forest as illustrated in Table 11.

Table 10. Planned versus actual forest management activities for the three last planning periods on the Lake Nipigon Forest.

Activity		Planning Period			Total
		1991-1996 [a]	1996-2001	2001-2006 [b]	
Harvest Area (ha for 5 yrs)	Planned	35,150	28,610	46,671	110,431
	Actual [c]	17,130	25,065	37,427	79,622
	Percent	49%	88%	80%	72%
Harvest Volume (m^3/yr)	Planned	726,607	709,491	855,492	2,291,590
	Actual [c]	388,190	491,403	573,886	1,453,479
	Percent	53%	69%	67%	63%
Regeneration Area (ha for 5 yrs)	Planned	29,625	28,695	43,675	101,995
	Actual	8,200	22,570	31,660	62,430
	Percent	28%	79%	72%	61%
Tending Area (ha for 5 yrs)	Planned	7,450	7,010	19,430	33,890
	Actual	5,410	10,770	10,910	27,090
	Percent	73%	154%	56%	80%
Free-to-Grow Area (ha for 5 yrs)	Planned [d]	14,700	14,957	10,048	39,705
	Actual	22,260	7,104	7,636	37,000
	Percent	151%	47%	76%	93%
Of area surveyed, area in FTG		18,512	4,550	4,186	27,248
FTG as percent of area surveyed		83	64	55	74

[a] Data from Trend Analysis Report and RPFOs.
[b] The 2005-2006 harvest data is based on an average of the previous four years.
[c] Harvest data for 2001-2006 includes salvage from the "snowdown" and wildfire.
[d] The FTG data includes one year from 1997 for the Auden Forest.

Table 11. Average yield in m^3/ha over three planning periods on the Lake Nipigon Forest.

	Planning Term			Average
	1991-1996	1996-2001	2001-2006*	
Yield in m^3/ha	113.31	96.27	76.67	90.72

*The 2005-2006 harvest data is based on an average of the previous four years.

The audit team noted the decreasing actual yield level on the Forest. A review of the average forecasted yield in the 2006-2011 FMP reveals 108.19 m^3/ha for all species combined (Table FMP-23). The Company has stated that this is an accurate projected yield for all species, but if hardwood is again underutilized, it would have an impact on the actual overall yield at the end of the period. As stated in the previous paragraph, the average yield in the 2001-2006 term is lower due to the large amount of salvage harvest during that period (lower volumes), as well as hardwood (higher volumes) not being harvested during the period.

The audit team is asked to comment on significant changes in forest unit area (conversions) or major age class shifts resulting from forest management activities. The Trend Analysis Report has provided a good review of the significance of the changes over the past 15-year period. As stated, with the exception of balsam fir, none of the forest units have fluctuated more than 4% in their distribution in the 15-year period. The increase in productive forest area is due in most part to the incorporation of the new FRI as well as differences associated with the base feature data in the planning inventory.

The data and figures in the Trend Analysis Report indicate that proportionately the area occupying each age class was fairly consistent for the 15-year period (1991 to 2001). However, in the 2006-2011 term, a significant shift from the previous 15 years is apparent in the 61-80 and 81-100 year age classes. This is due to the photo interpretation in the new 1995 FRI of many older stands that succeeded since the last

inventory was completed. In the absence of a stand-replacing disturbance these stands became defined by the previous sub-dominant category. In other words, a majority of the old trees were replaced with shorter/younger ones.

The impact of these changes and the changes in management objectives over the 15-year term is also thoroughly discussed in the Trend Analysis Report. The audit team reviewed the 2006-2011 FMP to determine if the management objectives recognize the disproportionately high amount of area in the 80-110 age-classes and to see if strategies have been developed. The selected management alternative developed using SFMM incorporates the application of regulation strategies in SFMM (see Section 2.3.3.2.3.1.1 of the 2006-2011 FMP) that will help achieve the sustainable wood supply objective by striving towards a balanced forest age class and forest unit structure (with an old forest "tail"), maintaining forest unit areas close to existing or preferred levels and minimizing timber loss to mortality.

Renewal Activities

The levels of achievement for actual versus planned activities in total regeneration have varied over the 15-year term from 28% (1991-1996) to 79% (1996-2001) and 72% (2001-2006). The lower figure in the 1991-1996 term is largely a result of not recording natural regeneration at that time. When the total actual versus planned regeneration is compared to the achievement of actual versus planned in harvest area, it appears reasonably similar (61% versus 72%). This suggests that regeneration is keeping pace with harvest.

It must be recognized that there is always a time lag between when an area is harvested and when regeneration is reported, to allow for the completion of mapping and surveying of regeneration activities. The audit team notes that of the 79,622 ha harvested in the 15-year period, 62,555 ha have been regenerated. The difference of 17,067 ha represents approximately 21% of the total 15-year harvest and is less than the average five-year harvest areas of 26,541 ha. This is a reasonable amount of area given the "lag-time" between harvest and regeneration and is similar to other forests in the boreal forest.

Free-to-Grow Assessments

A general indication of the status of renewal success on the Forest can be made when comparing the total area harvested to the total area declared FTG from 1991 to 2006. In this 15-year period, 79,622 ha have been harvested and 27,248 ha have been declared FTG. A five- to ten-year delay is normal between harvest and achieving FTG standards. The average time to FTG on the Forest was calculated to be nine years. As such, only a portion of the area harvested during the 15-year period would reach FTG standards by 2006. The following table summarizes a simple analysis of area available for FTG incorporating the assumption of an equal annual harvest throughout the 15-year period.

Table 12. Analysis of area available for FTG incorporating the assumption of an equal annual harvest throughout the 15-year period.*

Total Harvest 1991-2006	5-year Delay ($^1/_3$ of Total Harvest)	10-year Delay ($^2/_3$ of Total Harvest)	Available for FTG by 2006 (Total Harvest *minus* Delay)	Actual FTG	Difference (Actual FTG *minus* Available)
79,622	~ 26,500	-	~ 53,000	27,248	~ -25,700
79,622	-	~ 53,000	~ 26,500	27,248	~ 750

*All figures are in hectares.

Therefore, between 26,500 ha and 53,000 ha should have been available for FTG classification by 2006. The amount actually completed slightly exceeded the lower value but was about 25,700 ha short of the upper value. This suggests that the amount of area declared FTG during the 1991-2006 period was deficient.

One of the HPAs identified prior to the audit was whether FTG data was sufficient relative to the entire forest land base. Table 7 in the Trend Analysis Report shows the area harvested in the 1991-1996 period relative to the area successfully regenerated minus about 1,900 ha assessed in 2005 that was not available for inclusion in the TAR. If this unavailable area is included in the total area assessed there are still nearly 9,000 ha of unsurveyed area when compared to the harvest area. This confirms the audit team's conclusion in Section 3.6.1 that the amount of assessment area forecast and completed in the 2001-2006 term was insufficient compared with the previous level of harvest and corresponds with the results above that the amount of area declared FTG during the 1991-2006 period was deficient.

Fortunately, Norampac recognized this deficiency during the development of the 2006-2011 FMP and increased the forecast assessment program accordingly – to over 31,000 ha (about three times as much as was forecast in the 2001-2006 FMP). The audit team believes that completion of the forecast 2006-2011 assessment program will significantly reduce the current backlog of areas to be assessed and bolster the area declared FTG. Recommendation 17 in Section 3.6.1 addresses this finding.

Interestingly, according to Table 10, over the 15-year period, Norampac has achieved the highest percentage of actual to plan in the FTG assessments category. Of the 39,705 ha planned for assessment over the 15-year period, about 37,000 ha were completed – a 93% achievement level. As the amount of area assessed and declared FTG has been found to be deficient, this points to insufficient forecasts of assessment for the period.

Of the 37,000 ha surveyed in the 15-year period, 27,248 ha met FTG standards – a 74% level of success. The audit team notes that the FTG success rate has declined in successive plan periods – 83% in 1991-1996, 64% in 1996-2001 and 55% in 2001-2006. The reasoning for this decrease is not known and the following recommendation is given.

Recommendation 21: Norampac Inc. must determine the reason for the decline in the free-to-grow success rate over the past 15 years.

3.7.4 Achievement of Forest Sustainability

Prior to the implementation of the CFSA, the objective of forest management was to provide timber to the forest industry in a manner consistent with sound environmental practices and to provide for other uses of the forest. With implementation of the CFSA on April 1, 1995, recognition was given to the importance of forest sustainability. It should be kept in mind that the means of achieving forest sustainability under the CFSA is through the management of forest cover. According to the CFSA, forest sustainability is defined as long-term Crown forest health. The sustainability of a Crown forest is determined in accordance with the FMPM. The FMPM provides for determinations of the sustainability of Crown forests in a manner associated with the following key principals:

- Large, healthy, diverse and productive Crown forests and their associated ecological processes and biological diversity should be conserved.
- The long-term health and vigour of Crown forests should be provided for by using forest practices that, within the limits of silvicultural requirements, emulate natural disturbances and landscape patterns while minimizing adverse effects on plant life, animal life, water, soil, air and social and economic values, including recreational values and heritage values.

The methods of planning for and assessing the achievement of forest sustainability are described in the FMPM. It begins with an eight-step process that includes gathering background information, setting objectives and developing strategies, identification and analysis of management alternatives, selection of a preferred management alternative, and the identification of specific areas for forest operations. Throughout the process, opportunities are available to the public to participate and provide input into the development of the FMP. The assessment of achievement of forest sustainability involves the analysis of trends associated with a set of criteria and indicators of sustainability, given in the FMPM. The FMP Planning Team and Local Citizen's Committee chose a management alternative which best met the target ranges of indicators and objectives. The indicators utilized in the 2001-2006 FMP included bounds of

natural variation, forest unit area, forest diversity indices, managed Crown forest area available for timber production, preferred habitat for selected wildlife species, the percentage of AHA which is actually utilized, the frequency distribution of clearcut and wildfire sizes, landscape pattern indices, composition by age, old growth, and the current landscape pattern. The above listed indicators all contributed to meeting the six forest sustainability criteria listed in Table 13.

Table 13. Summary of assessment of forest sustainability.

Forest Sustainability Criteria	Met (Yes/No/Partial)	Audit Team Comments
Conservation of Biological Diversity	Yes	Forest diversity and biological diversity is not changing. Forest landscape indices are similar to those at the regional and provincial levels. A variety of habitat types for the selected wildlife species and all species remain well represented on the Forest.
Maintenance and Enhancement of Forest Ecosystem Condition and Productivity	Yes	Crown managed forest area has remained relatively stable since 1991. However, significant net loss of Crown forest (~15%) forecast to be lost with achieving the desired forest condition in the 2006 FMP, due to accumulating effects of no cut zones (NDPEG peninsulas) and AOC reserves (varying from 6% to 27%).
Conservation of Soil and Water Resources	Yes	Forest practices as viewed in the field by the audit team have minimized the impact on soil and water resources. Increasing concern on the impact of management activities on the Groundwater Recharge Zones (GRZs) for the speckled trout fishery. GRZs are also discussed in Section 3.3.7.
Forest Ecosystem Contributions to Global Ecological Cycles	Yes	Renewal and harvest in balance. The forecast of FTG assessments (31,000 ha) needs to be completed in the 2006-2011 term to ensure balance is being maintained.
Multiple Benefits to Society	Partial	Excellent participation by First Nations in forest management activities. Tourism, trapping and other users accommodated. Appendix E wood supply commitments were not fully met.
Accepting Society's Responsibility for Sustainable Development	Yes	Increasing need and reliance by local communities on employment from the Forest. Data provided indicates contractors utilizing local people as much as possible (including Aboriginal communities, see Table 17). A best practice for successful efforts in increasing Aboriginal employment opportunities was given.

The Trend Analysis Report provides a thorough assessment of forest sustainability, tracking the indicators utilized to meet the sustainability criteria set out in the FMPM. Based on a review of the 2001-2006 FMP, interviews with Norampac, MNR staff, the LCC, overlapping licensees, and First Nations, as well as public input, field observations and the review of the forest management planning documentation, progress is evident in all of the criteria. The audit team noted that the long-term health and vigour of the Forest is being provided for by using forest practices within the limits of silvicultural requirements as per the CFSA.

Forest sustainability is not the same as forest stability or sustained, non-declining timber supply. Forest composition and structure will change over time from natural processes and forest management activities. For example, the age class gap depicted in the FRI (Figure 19) could cause harvest levels to drop below current levels at some point in the future. Wildlife habitat supplies will also change over time. The forecasted changes are deemed acceptable as measured by CFSA requirements and the approval of

the current forest management plan in today's context. As both the forest and society's values related to the forest change over time, so will the determinations of "sustainability" or what constitutes as "good forest practices" or "good forest management". Given the current definition of forest sustainability in the CFSA the audit team believes that although timber volumes and other values such as wildlife habitat will fluctuate over time, the Forest is being managed sustainably.

3.8 Contractual Obligations

The Sustainable Forest License number 550412 was issued to Norampac Inc. on December 16, 2002. In May 2003, the SFL was amended to account for boundary changes due to land withdrawals originating from the Ontario Lands for Life initiative[29]. On May 24, 2005 the SFL was updated to account for changes in compliance planning and monitoring. The most current version dated March 1, 2006 included Appendix E changes, changes resulting from the Northern Aspen Veneer Initiative to the Longlac Wood Industries commitments and reference to the North American Datum 83 map.

Norampac is the prime license holder for the Lake Nipigon Forest. Appendix E provides direction on delivering softwood sawlog commitments to Great West Timber and Northern Sawmills in Thunder Bay and also the Domtar-White River sawmill. As per Appendix E, poplar is directed to existing mills in Longlac (Longlac Wood Industries), Terrace Bay (Neenah Paper), and Nipigon (Columbia Forest Products). The Appendix E wood supply commitments and actual achievement levels for conifer are shown in Table 14, and for hardwoods in Table 15. Please note that the actual delivery data is derived from several sources including TREES[30] and is meant to indicate trends, not the final correct numbers.

Table 14. Appendix E Wood Supply Commitments and level of achievement for conifer (spruce, pine and fir-SPF) for the Lake Nipigon Forest (2001-2006).[a]

Appendix E Wood Supply Commitments	Commitment over 5 Years (m^3)	Actual Delivered over 5 Years (m^3)	Percent Achievement
Great West Timber (SPF)	625,000	~276,889	44 %
Great West Timber (SPF-First Right of Refusal)	140,000	Could not be determined	N/A
Northern Sawmills/Long Lake Forest Products/Nakina Forest Products (SPF)	800,000	~792,081	99 %
Sub-Total	*1,565,000*	*~1,068,970*	*68 %*
Domtar-White River (SPF)	880,000	~121,599	14 %
Bush Chips and Salvage Chipping[b] Exchange[c] (chips, etc.)	Nil	~559,117 (5 yrs) ~834,648 (3 yrs)	N/A
Others including Neenah Paper, Abitibi Consolidated and Bowater	Nil	295,978	N/A

[a] Numbers are an approximation of the level of achievement only.
[b] Bush chips delivered into Red Rock April 1, 2001 – March 31, 2006. Regular harvest and salvage harvest.
[c] Softwood chips and fine chips delivered to Norampac from White River April 1, 2003 – March 31, 2006.

[29] The Ontario government started the Lands for Life process to respond to public demand for integrated land use planning and wilderness protection. It concluded with the release of Ontario's Living Legacy Land Use Strategy in 1999.

[30] **T**imber **RE**sources **E**valuation **S**ystems. An MNR database system to track harvest volumes reported by industry.

Table 15. Appendix E Wood Supply Commitments and level of achievement for hardwood for the Lake Nipigon Forest (2001-2006).*

Appendix E Wood Supply Commitments	Commitment over 5 Years (m^3)	Actual Delivered over 5 Years (m^3)	Percent Achievement
Columbia (Po veneer)	25,000	~ 4,774	19%
Longlac Wood Industries (Po veneer/flakes)	350,000	~ 34,393	10%
Neenah Paper (Po pulp)	350,000	~ 186,483	53%
Buchanan Northern Hardwoods (hardwoods)	0	~ 276,935	N/A
Other	0	~ 2,090	N/A

The following excerpt is taken from the 2006-2011 FMP and provides an explanation of the wood flow and exchanges as well as the complexity of fibre flow on the Forest.

> The Lake Nipigon Forest supplies Norampac's linerboard mill in Red Rock with mill furnish primarily through a fibre exchange agreement between Domtar Inc., and Buchanan owned companies Great West Timber and Northern Sawmills in Thunder Bay and also with the Domtar Inc. White River sawmill. Domtar Inc. secures half ownership of Norampac Inc. and manages the Lake Nipigon Forest SFL through a management agreement with Norampac. The Norampac/Great West Timber/Northern Sawmills/Domtar-White River fibre exchange agreement facilitates the exchange of wood fibre between Norampac Inc. and Great West Timber/Northern Sawmills/Domtar – White River, thus assuring all parties of a reliable, secure and economical supply of fibre for their respective mill operations in Red Rock, White River, and Thunder Bay. Under Appendix E, approximately two-thirds of the softwood from the Lake Nipigon Forest moves to Great West Timber and Northern Sawmills. The remaining one-third of softwood from the Forest moves to the Domtar sawmill in White River, either directly or through exchange agreements.
>
> Under the auspices of a Forest Resource License on the Lake Nipigon Forest, and a Memorandum of Agreement between Domtar and BFPL, harvest operations by BFPL on the Lake Nipigon Forest supply Great West Timber and Northern Sawmills with sawlog material, which in turn supplies the Red Rock mill with softwood chips, sawdust and shavings for the production of kraft linerboard (see Section 2.3.3.1.3.1 [of the 2006-2011 FMP]). The Domtar Inc.–White River Sawmill also holds a Forest Resource License on the Forest and through both a Fibre Supply Agreement and a Fibre Exchange Agreement, supplies the Red Rock mill with softwood chips, sawdust and shavings.
>
> The First Nation communities of Red Rock Indian Band, Biinjitiwaabik Zaaging Anishinaabek and Animbiigoo Zaagi'igan Anishinaabek also currently hold Forest Resource Licenses (FRLs) to harvest a mixture of conifer and hardwood from the Lake Nipigon Forest. These operations have supplemented the BFPL operation in supplying sawlog material to Great West Timber and subsequently Norampac through fibre exchange, as well as supplementing the Domtar Inc. White River operation to supply sawlog material to Domtar's White River sawmill and subsequently Norampac through fibre exchange. Bush chipping operations under these First Nation FRLs have supplied a very significant amount fibre (from either regular harvest allocations or salvage operations) directly to the Norampac Mill in Red Rock throughout the April 1, 2001 to March 31, 2006 plan period. During the 2006-2011 plan period, the Norampac Mill in Red Rock will be prepared to

receive bush chips from First Nation operations should any stands be more suitable for bush chipping rather than tree-length operations.

During implementation of the 2001-2006 Lake Nipigon Forest FMP, a significant portion (26%) of the softwood sawlog harvest has been delivered to Long Lake Forest Products in Longlac. This BFPL-owned sawmill is not officially part of the Lake Nipigon Forest Fibre Exchange/Supply agreements, and has no sawlog commitment from the Lake Nipigon Forest. However, the Lake Nipigon Forest related sawlog volume loss to Great West Timber and Northern Sawmills that is being delivered to Long Lake Forest Products is made up from other Forests closer to Thunder Bay where BFPL also has sawlog commitments. Through this internal company exchange mechanism, BFPL is better able to control/minimize transportation costs by directing sawlogs to the closest sawmill to the Forest (in this case Long Lake Forest Products is closer than Great West Timber or Northern Sawmills).

The audit team received a significant amount of input and concerns from Overlapping License Holders, the public, Appendix E wood supply commitment holders and the auditees about the wood flow or lack thereof on the Forest. An attempt was made to derive an accurate set of numbers on the actual wood flow and fibre exchange from the Forest for the audit period, but it was not possible. The complexity in trying to balance the data between the MNR TREES numbers and that provided by the companies (i.e. Longlac Wood Industries, Great West Timber, Northern Sawmills, Nakina Forest Products, Long Lake Forest Products, Buchanan Northern Hardwoods, Columbia Forest Products, Domtar-White River sawmill and the Norampac, Red Rock mill) made it difficult. In addition to the above complexities, the wood deliveries included the following:

- regular harvest allocations;
- regular harvest allocations with salvage rate (2001 blow-down);
- 2001 blow-down salvage allocations (natural depletion);
- Nipigon Fire 12 Salvage Allocations (natural depletion); and
- Nipigon Fire 58 Salvage Allocations (natural depletion).

However, the trends were evident and the data in Table 14 and Table 15 of this report provide sufficient evidence, whether the Appendix E wood supply commitments were met or not. As discussed previously, Domtar-White River obtains wood from the Lake Nipigon Forest for its sawmill. In their discussion and input with the audit team, Domtar has made it clear that it favours a shareholder-type of SFL for both the Lake Nipigon and Armstrong Forests. Longlac Wood Industries staff also believes a shareholder type of SFL will enable Longlac Wood Industries to obtain its wood supply commitments in a more sustainable manner. However, Norampac has stated that its business-to-business agreement with BFPL makes a shareholder approach difficult. An interview with BFPL staff indicated that the existing fibre commitments can be met and that Longlac Wood Industries can have all the poplar from the Forest for its needs.

Based on the considerable input the audit team received on the issue of wood flow and allocations, the complexities of past and existing business agreements in place, the reality of economic wood flow and because of the many changes occurring in the forest industry at this time, the audit team believes the entire Appendix E approach to wood supply commitments would benefit from a review. A report entitled Towards Resolving Utilization Issues: A Process to Manage Unutilized Fibre[31] exists which may provide some useful input into resolving the wood supply issue on both the Armstrong and Lake Nipigon Forests.

Suggestion 17: The Ministry of Natural Resources and Norampac Inc. should incorporate the principles listed in the report Towards Resolving Utilization Issues: A Process to Manage Unutilized Fibre (1999) to resolve the Appendix E wood supply commitments.

In spite of the complexity of wood flow, it appears that the various mills that depend on the Lake Nipigon Forest for their fibre needs did receive sufficient wood during the audit period. The wood flow may not

[31] Industry/MNR Utilization Task Team. 1999. Towards Resolving Utilization Issues: A Process to Manage Unutilized Fibre. 12 pp. + Appendices.

have met the Appendix E commitments, but the market-driven necessity of obtaining wood economically made it possible for the mills to meet their fibre needs. The question of whether a shareholder type of arrangement is best suited for the Lake Nipigon Forest, or whether the current arrangement or some other approach is more appropriate, is outside the scope of the audit. The audit team noted that a "Lake Nipigon Test Case Study" completed in 2004 by the Ontario Poplar Veneer Consumers addressed the issue of companies that had Crown-directed poplar veneer volumes, and that were not receiving the directed poplar veneer volumes. The audit team noted that a considerable amount of time is spent by all parties on trying to meet the existing agreements and the Appendix E wood supply commitments that are not being fully met. The 2001 IFA had several recommendations directed to the Appendix E wood supply commitments, which were not met.

Clause 3 of the SFL directs the holder of the SFL to meet the wood supply agreements set out in Appendix E. Responsibility for implementing Appendix E and Clause 3 is directed at the SFL holder. The most common approach is to implement the condition through a Memorandum of Agreement (MOA) or first right of refusal. From interviews, the audit team was told that Norampac is not prepared to issue any additional MOAs. Given the above, the following recommendation is given.

Recommendation 22: The Ministry of Natural Resources must determine if the Appendix E approach to wood supply commitments needs to be replaced with a different process.

Memoranda of Agreements are in place for Northern Sawmills, Longlac Wood Industries, Columbia Forest Products and Great West Timber, as stipulated in the SFL. The MOAs between Norampac and Domtar-White River and between Norampac and Neenah Paper were not in place.

Recommendation 23: Norampac Inc. must complete the Memoranda of Agreements as stipulated in Appendix E of the Sustainable Forest Licence.

The audit team is asked to determine if the allowable harvest level in the FMP is sufficient to meet the Appendix E wood supply commitments. Although there is a difference of 185,000 m^3 over five years (37,000 m^3/yr) between the committed conifer volume and available conifer harvest volume (Table FMP-20), this has been used to make up for volume loss on the Armstrong Forest through OLL land reductions. A shortage of 185,000 m^3 over five years on the Armstrong Forest was made up with this difference from the Lake Nipigon Forest since the commitment holder was the same (i.e. Buchanan Forest Products). The available conifer wood supply was sufficient to meet both the market demand and allowable harvest levels.

The available poplar volumes were insufficient to meet the committed volumes and a proportionate reduction was allocated correctly. The white birch harvest volumes were uncommitted during the audit period. The 2006-2011 FMP states that MNR has accepted business plans from Biinjitiwaabik Zaaging Anishinaabek for the establishment of a birch sawmill and fuelwood facility, with an associated supply commitment currently under review. In addition to the birch supply to Biinjitiwaabik Zaaging Anishinaabek, Longlac Wood Industries has entered into business-to-business negotiations with Norampac for a portion of the white birch supply from the Lake Nipigon Forest as held by the SFL holder. This would be a business-to-business agreement with no MNR supply commitment.

Independent Forest Audit Action Plans and Status Reports

The Company and MNR were required to submit an action plan responding to the 2001 IFA of the Lake Nipigon and Auden Forests' recommendations within two months of receiving the final audit report and provide a status report on the implementation of the recommendations within two years following approval of the action plan. The final audit report was received on June 15, 2002. The IFA Action Plan was submitted on April 14, 2003 and approved May 26, 2003, making it nine months late. The IFA Action Plan Status Report was submitted on May 9, 2006 which makes it 11 months late. The audit team recognizes that both the action plan and action plan status report are late but note that audit

recommendations are increasing in number, along with the number of audit procedures which often requires interaction, liaison and budgeting between MNR, the Company and/or corporate MNR. Rather than directing a recommendation at the Company and MNR to adhere to action plan reporting dates, the audit team believes that a suggestion is warranted to accommodate the increasing complexity and requirements of many of the recommendations.

Suggestion 18: Corporate Ministry of Natural Resources should consider lengthening the time to prepare an action plan report from two months to six months.

The action plan status report was late by nearly a year. The audit team does believe a two-year time interval to prepare an Audit Action Plan Status Report is reasonable and lists the following recommendation.

Recommendation 24: The Ministry of Natural Resources and Norampac Inc. must meet the Independent Forest Audit Status Report submission date.

The public has been notified of the availability of IFA reports and associated action plans on the MNR website, which can be accessed at http://ontariosforests.mnr.gov.on.ca/audit.cfm.

Of the 28 recommendations from the 2001 IFA, eight were directed to the Ministry and 14 to the Company; and six recommendations were directed to both the Ministry and Company. The action plan and action plan status report prepared by the Company and MNR were well done and met the requirements (i.e. the action and method of tracking progress, the organization and position responsible, the deadline date and the status were identified and recorded).

Some of the action items required resources outside the capacity and/or responsibility of the local Ministry and Company and are still ongoing (e.g. MNR Forest Management Branch, Forest Policy Section is sponsoring the development and finalization of various guidelines in cooperation with the MNR Fisheries Section, the federal Department of Fisheries and Oceans and the Forest Health and Silviculture Section of the MNR). Some action items associated with a recommendation were completed, whereas other action items with the same recommendation are still ongoing. As per the requirements of the IFAPP (Appendix E), Forest Management Branch developed a summary of the action plan status report and identified the status of the recommendations. Due to the fact that the final 2001 IFA Report was late (i.e. the audit was completed in 2001 and the final corrected version of the audit report was not received until 2002) and the subsequent late action plan and action plan status report submissions, the summary of the action plan status report was received by the audit team just a week before the field audit was to start (i.e. June 5, 2006). Although the just-in-time submission did not cause undue difficulties for the audit team, it does demonstrate that the cumulative effect of late submissions could cascade down to where even an audit cannot be effectively completed. More importantly, some of the recommendations and action items need to be addressed in an expedient manner to ensure the forest is being managed in an appropriate and sustainable manner. The audit team has reviewed the Forest Management Branch summary, and identified some action items which need to be completed. These are listed in Table 16 (also see Recommendation 25).

Table 16. Completion status of the 2001 Independent Forest Audit recommendations.

	Recommendations from the 2001 Lake Nipigon Forest IFA	Status	Completed: Yes/No/ Ongoing
1	The Minister of Natural Resources should immediately sign the Sustainable Forest License for the amalgamated Lake Nipigon Forest.	Completed December 16, 2002.	Yes
2	The OMNR and Domtar should respond to correspondence received from the public in a more timely manner (e.g., within two weeks from date received).	Satisfactory.	Yes
3	The OMNR should undertake a native values collection exercise with Sand Point First Nation, work with Biinjitiwaabik Zaaging Anishinaabek to obtain the revised values map while addressing their confidentiality concerns, and hold discussions with Pays Plat First Nation with the objective of obtaining a fuller set of native values.	Funding and support provided by MNR. A Preliminary Report of the Protection of Identified Native Values was in place but verification still to be completed by Pays Plat First Nation in summer of 2006.	Yes Ongoing
4	In future plans, the available forest area should more closely reflect the actual condition of the Lake Nipigon Forest. Landbase statistics are to be directly and easily comparable between Tables FMP-1, FMP-2, and FMP-9. These tables should accurately portray current forest conditions at the beginning of the planning term, including the extent of area in depleted and barren and scattered conditions.	The land base is now accurately recorded in Tables FMP-1 and FMP-2.	Yes
5	The OMNR should review its approach to socioeconomic analysis and the applicability of the Socio-Economic Impact Model. The OMNR should consider a more locally based form of analysis.	New SEIM in place with flexibility to use an alternative MNR supported methodology.	Yes
6	Domtar should forecast bypass using the definition provided in the Forest Management Planning Manual.	Bypass determined as per FMPM direction.	Yes
7	Land allocations for specific wildlife mosaic blocks or core areas should not be withdrawn or deferred in the calculation/determination of the available harvest area. Only lands where forest management operations are specifically excluded, through a land-use planning decision or a specific reserve prescription, should be withdrawn from the available forest area.	An internal provincial Marten Interpretation Note was utilized during plan production.	Yes
8	The OMNR should conduct the necessary fish habitat inventory to support forest management planning.	MNR provided direct exchange of NRVIS data for the 2006-2011 FMP. New Site Guide under development.	Yes Ongoing
9	The OMNR should ensure that the Natural Resource Values Information System is accurate, regularly updated, and adequately supported.	Updated NRVIS data provided by MNR in winter of 2005. Training and "gatekeeper" within MNR required (see Recommendation 9 of this report).	Yes No

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Table 16 continued.

	Recommendations from the 2001 Lake Nipigon Forest IFA	Status	Completed: Yes/No/ Ongoing
10	The OMNR should continue to collect and interpret caribou data to support the implementation of the woodland caribou guidelines and the maintenance of caribou on the Lake Nipigon Forest. Connections between winter habitat and known calving lakes (e.g., Lake Nipigon, Onaman, Fullerton, and Atitogama Lakes) should be maintained.	Caribou and moose habitat assessments given high priority and information collated and provided in Appendix R of the 2006-2011 FMP. Still additional MNR information is required, keep collecting and interpreting information. Issue was raised as an HPA.	Yes Ongoing
11	Domtar and the overlapping licensees should improve the identification of unmapped tributary streams and ensure that the appropriate water crossing and Area of Concern prescriptions are implemented.	MNR was to develop a better definition of what a stream is - a fisheries guide is in development. Protocol for the Review of Water Crossings proposed through the Forest Management Planning Process completed April, 2005. Training done at spring AWS meetings, field guide classification done and amendment versus revision addressed in 2004 FMP. Improvement from previous period noted in the field visits.	Ongoing Ongoing Yes
12	The OMNR, Domtar, and the overlapping licensees should increase training and compliance to achieve the recommended number and size of snags, particularly in conifer stands.	Training completed and "flash card" for snag tree retention produced in 2002 (see Recommendation 13 of this report).	Ongoing
13	Domtar should develop a comprehensive strategy to manage untreated winter roadside slash accumulations. This strategy should include: a) an assessment of the amount of productive forest area currently lost to roadside slash piles b) the development of techniques and operating procedures, to reduce all roadside slash accumulations.	Some slash piling and burning done and area determination completed, but inconsistent slash piling and burning viewed during audit (see Recommendation 13 of this report).	Ongoing
14	The OMNR should facilitate the disposal of slash piles, primarily through its annual review and approval of Domtar's slash pile burning plan.	Cooperation between MNR and Company in gaining approvals in a timely manner was done.	Yes
15	Domtar should develop strategies to minimize rutting in the future. Best management practices from Forest Management Guidelines for the Protection of the Physical Environment[32] should be employed where appropriate.	Training completed at spring AWS meetings. A guide was developed by FERIC. FOIP monitor compliance for rutting. "Flash Card" in development.	Yes Yes Ongoing

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[32] MNR. 1997. Forest Management Guidelines for the Protection of the Physical Environment. Queen's Printer for Ontario. 39 pp. + Appendices.

Table 16 continued.

	Recommendations from the 2001 Lake Nipigon Forest IFA	Status	Completed: Yes/No/ Ongoing
16	Domtar and the OMNR should develop evaluation criteria and measures of site disturbance for incorporation into their compliance and monitoring plans. This should be accompanied by the development of an inspection strategy for monitoring site disturbance on sensitive sites.	Evaluation criteria not developed since Site Guide in development. *Monitoring being done through FOIR* compliance inspections.	Ongoing Yes
17	Domtar should estimate the volume and marketability of the unutilized poplar currently piled at roadside on the Paint Lake, Marline Lake and Nigig blocks. The timber should be disposed of, regardless of its marketability. Domtar and the OMNR should develop strategies to prevent similar occurrences in the future.	Volume and marketability determined. Timber was not disposed, no longer useable. Utilization monitored through the MNR Annual Compliance Operations Plan but utilization of all merchantable poplar not fully achieved.	Yes No Ongoing
18	Domtar should ensure that adequate resources are available for timely planning of salvage operations.	Additional staff hired for Lake Nipigon Forest (additional SFL Forester was hired).	Yes
19	Domtar and the overlapping licensees should improve road maintenance practices and water crossing installations to meet relevant legislation and standards.	Norampac utilizes a "Pre-Construction Water Crossing Report and Approval Form".	Yes
20	Domtar and the overlapping licensees should ensure that all bridges are correctly marked with approach signs and corner posts.	Twenty-five existing bridge location installations recorded. AWS requires one FOIP inspection per water crossing installation.	Yes
21	In candidate free-growing areas where it is not readily evident that the new stand clearly meets or fails to meet the renewal standards, Domtar should employ more intensive survey methodologies (e.g., ground surveys, calibration of aerial surveys) and collect the appropriate quantitative data needed to make an accurate assessment.	Where the results could not be easily determined from an aerial assessment, a ground survey is implemented. Additional ground verification takes place where required.	Yes

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Table 16 continued.

	Recommendations from the 2001 Lake Nipigon Forest IFA	Status	Completed: Yes/No/ Ongoing
22	Compliance monitoring and verification by Domtar, the overlapping licensees, and the *OMNR should* be improved on the Lake Nipigon Forest. Improvements should include:		
	• ensuring that appropriate staff are properly trained in compliance monitoring and reporting;	All five overlapping license holders have certified compliance inspectors.	Yes
	• ensuring that all follow-up actions are implemented;	Training provided at AWS meetings.	Yes
	• meeting at least quarterly to discuss issues and provide education and training opportunities for field staff to ensure that compliance with all applicable legislation, regulations, and guidelines is being achieved;	Meetings held on basis of key factors.	Yes
	• periodic joint field inspections to foster good communications and establish common operational expectations; and	A considerable number of inspections were completed with the Norampac staff and foreman from the overlapping licensees.	Yes
	• ensuring that adequate resources are available to conduct an effective compliance monitoring program.	MNR should review its allocation of resources (see Recommendation 13, Recommendation 15 and Recommendation 18 of this report).	No
23	Domtar and the OMNR should exercise greater diligence in meeting annual report submission dates and review deadlines.	Some delays due to development of 2006-2011 FMP – reasonable. Now discretionary for MNR to review.	Yes
24	Upon delivery of the new Forest Resources Inventory, Domtar should undertake an assessment of the areas described as barren and scattered to determine the extent that these areas require natural regeneration reporting and free-to-grow assessments.	A large amount of FTG is planned for the 2006-2011 period to bring the inventory up-to-date on renewal.	Ongoing
25	Domtar should facilitate annual meetings among the hardwood users on the Lake Nipigon Forest to rationalize the flow of poplar from the forest and ensure that commitments are being met.	Longlac Wood Industries, Neenah Paper and Colombia Forest Products attended in those years where they took wood.	Yes
26	Domtar and Kimberly-Clark Inc. should finalize and sign a memorandum of agreement covering the poplar fibre being made available to Kimberly-Clark Inc.	Neenah Paper (formerly Kimberly-Clark Inc.) did receive wood but did not have a signed MOA in place during the audit period (see Recommendation 23 of this report).	No
27	Domtar should take a more active and regular role in monitoring payments into the Renewal Trust account and Forestry Futures charges by the overlapping licensees.	Completed in 2004-2005.	Yes
28	Domtar and the OMNR should continue to work with recognized First Nations and explore additional economic opportunities for these communities. These opportunities should not be limited to harvesting operations.	Excellent progress made during the audit period. Approximately 25% of the total harvest, 13% of the total trees planted, 56% of the pre-commercial thinning and 4% of the mechanical site preparation was completed by First Nations.	Yes

Based on the field visits, interviews and public input, the audit team believes the following action items in recommendations from the previous 2001 IFA were not completely addressed in a satisfactory manner and need continued attention.

Recommendation 25: The Ministry of Natural Resources and Norampac Inc. must complete the action items arising from the recommendations in the 2001 Independent Forest Audit as follows:

- **There is no Memorandum of Agreement in place with Neenah Paper.**
- **Slash piling is still inconsistent.**
- **Annual Report submission dates by the Norampac Inc. and the review and correction deadlines by the Ministry of Natural Resources still need improvement.**
- **Audit findings were incorporated into current operations and future planning as required, but the requirement to include an audit summary and progress report in the Annual Report was overlooked.**
- **The definition of what constitutes a permanent stream and water crossing is to be included in the revised access roads and water crossing guide and the revised fish habitat guide being prepared.**

Forest Renewal Trust Fund

The Company maintains records of all of the activities undertaken under the auspices of the Forest Renewal Trust Fund. The audit team reviewed the Specified Procedures Report and randomly selected and viewed a representative sample, equaling 32% of the of the activities reported as carried out with funds from the Renewal Trust Fund for the April 1, 2004 to March 31, 2005 fiscal year. The mapped records accurately reflected the work done in the field.

A review of MNR statements indicated that there was a one-month level of Forestry Futures charges including sub-accounts outstanding in the account as of May 24, 2006. This is a normal 30-day balance and is what would be expected to be seen. Norampac is required to maintain a minimum balance in the Forest Renewal Trust account as specified in the SFL. The minimum balance was maintained throughout the five-year period.

The SFL requires an analysis of the forest renewal charges to be carried out by the license holder no less frequently than every five years, in conjunction with the term of the FMP. Norampac completes an analysis every year, usually around February, which records the past revenue derived from the harvest levels and actual renewal expenditures, as well as forecasts the level of harvest and associated renewal activities several years ahead. This analysis has maintained a level of renewal trust funding sufficient to meet the renewal funding requirements and maintain the required minimum balance during the audit period.

Forest Compliance

A review of approval dates for the five-year and annual compliance plans prepared by Norampac and the issuance dates of Cut Approvals and FRLs found that the compliance plans were approved by MNR before it issued any Cut Approvals or FRLs.

Section 21.5 of the SFL (May 2005) states that "*The Company and those Overlapping Licensees referred to in paragraph 21.1 are responsible for establishing and delivering internal prevention/education programs and for providing individual staff training to competency standards approved by the Ministry of Natural Resources. The compliance plan must describe the internal prevention/education program responsibilities of the Company and applicable Overlapping Licensees.*"

Norampac outlined an internal compliance prevention/education program in the 2001-2006 Compliance Plan. It includes commitments to educate and train management staff and encourage overlapping

licensees to train all personnel on proper operating procedures, relevant provincial regulations, policies and guidelines, to protect and maintain the health of the forest ecosystem and to promote public safety. A commitment was also made to improve communication between Norampac, MNR and overlapping licensees regarding compliance matters. Norampac also commits in the compliance plans to keep abreast of seminars and workshops which might be of advantage to overlapping licensees for compliance training purposes and will encourage attendance. A summary of compliance issues identified through past inspections and compliance audits are highlighted and include trespasses in unapproved areas, utilization standards and damage to plantations.

To meet these commitments, Norampac conducted annual work schedule meetings with each overlapping licensee and MNR to discuss site-specific operating prescriptions and review environmental, safety and legislative requirements and discuss compliance priorities. In addition to the AWS meetings held each spring, Norampac also holds meetings throughout the year as the need arises. Norampac also addressed compliance issues identified through inspections during previous operating terms by conducting training workshops (e.g. construction of water crossings) and the provision of additional information to overlapping licensees (e.g. information on CLAAG harvest practices, water crossings, snag tree requirements, procedures for unidentified streams) through hand-outs at meetings and placards. This activity supports the compliance plan objective of continuous improvement.

Domtar, manager of the forest on behalf of Norampac, also has an EMS (ISO 14001) in place which is reviewed annually with staff and silviculture contractors. It provides a means of organizing environmental concerns and through setting objectives and targets, promotes continuous improvement. The EMS program also includes components applicable to compliance prevention and education. EMS booklets are distributed to all personnel and include emergency phone numbers, company policy commitments, health and safety responsibilities and reporting requirements, wildfire prevention and control, how to handle spills, and applicable standard operating procedures.

The 2001-2006 Compliance Plan for the Lake Nipigon Forest also assigns roles and responsibilities for the SFL holder, qualified overlapping licensees, and non-qualified overlapping licensees.

Through the overlapping licence agreements, overlapping licensees are responsible for providing training to staff and contractors to ensure operations meet compliance requirements. BFPL (qualified overlapping licensee) also has an EMS program in place which addresses environmental concerns of its operations on the Lake Nipigon Forest.

Norampac staff, overlapping licensees and contractors took advantage of workshops, training opportunities and operational meetings that were coordinated by Norampac.

Operations on Mining Claims

Upon receipt of the AWS, the MNR notified all recorded and patented claim holders located within proposed operating areas on the Lake Nipigon Forest of Norampac's intent to operate on the areas, as required of the SFL. Copies of the letters and addresses were on file for four out of the five years of the audit term. Recorded and patented claim holders were instructed to address any concerns to the Company.

First Nations

Norampac is required to work cooperatively with the MNR and local Aboriginal communities in order to identify and implement ways of achieving a more equal participation by Aboriginal communities in the benefits provided through forest management planning. This requirement is contained in the license and supports Condition 34 of the Declaration Order.

Five-year harvest commitments for the 2001-2006 planning term of the Lake Nipigon Forest were finalized with Red Rock Indian Band, Biinjitiwaabik Zaaging Anishinaabek and Animbiigoo Zaagi'igan

Anishinaabek. Annual commitments for the 2001-2006 FMP were as follows: Biinjitiwaabik Zaaging Anishinaabek - 58,860 m^3, Animbiigoo Zaagi'igan Anishinaabek - 14,530m^3, and Red Rock Indian Band - 69,790 m^3.

Animbiigoo Zaagi'igan Anishinaabek did not have any issues with the 2006-2011 FMP and continued to receive a fair allocation on the Lake Nipigon Forest. In addition to regular harvest licensing, Animbiigoo Zaagi'igan Anishinaabek took part in salvage harvesting. Success for this First Nation meant developing a partnership with a logging contractor who had a good track record and who knew the business.

Biinjitiwaabik Zaaging Anishinaabek expressed a concern about getting maps from Norampac and recently there has been improvement in this matter. The community felt that they continued to get a fair allocation from the Lake Nipigon Forest. Success for Biinjitiwaabik Zaaging Anishinaabek meant starting small and being persistent.

Red Rock Indian Band did not have any issues with the 2006-2011 FMP and they too received a fair allocation of wood for harvesting. Eighty percent of employees in their operation are Red Rock Indian Band members. Past success can be attributed to the 4Ks-Logging operation, which had a knowledgeable workforce and good management. Red Rock Indian Band also had a very successful tree planting contractor who employed First Nation members.

Discussions were underway between Sand Point First Nation and MNR for a cedar allocation, as Sand Point First Nation was not interested in harvesting other species. Table 17 below provides an indication of the percentage of forest management activities employing Aboriginal community members. The adjoining Armstrong Forest is included as Norampac is also the SFL holder on that forest and the data provides a basis for comparison.

Table 17. Participation of Aboriginal peoples in forest management activities on the Armstrong and Lake Nipigon Forests for the 2001-2006 term.

Category	Armstrong Forest (%)	Lake Nipigon Forest (%)
Total harvest by volume including salvage	19	27
Total number of trees planted	45	13
Pre-commercial thinning area	0	56
Ground tending area	49	0
Mechanical site preparation area	36	4

The audit team provides a best practice to Norampac, MNR, Animbiigoo Zaagi'igan Anishinaabek, Biinjitiwaabik Zaaging Anishinaabek and the Red Rock Indian Band to acknowledge the attempts and efforts made in providing employment opportunities to Aboriginal community members and encourages the continuation of these endeavours.

Best Practice 1: Norampac Inc., the Ministry of Natural Resources, Animbiigoo Zaagi'igan Anishinaabek, Biinjitiwaabik Zaaging Anishinaabek and the Red Rock Indian Band are to be commended for their successful efforts in helping the District Manager address Condition 34 of the Declaration Order.

Pays Plat First Nation did express concern that they are not receiving any benefits with regard to employment opportunities on the Lake Nipigon Forest. Currently, the reserve faces 80% unemployment rate and no one is working in forest operations, despite members having the skills to operate machinery and equipment, or manage a tree plant. As previously noted (Section 3.6.2), Pays Plat First Nation was not mentioned in any of the Condition 34 Reports from 2001 to 2005.

Recommendation 26: The Ministry of Natural Resources and Norampac Inc. must continue efforts to identify and implement ways of achieving more equal participation of Pays Plat First Nation in the benefits provided through forest management planning.

Forest Information Manual

The Company met its contractual obligations as per the Forest Information Manual. The data management portions are handled with efficiency and professionalism. The MNR's obligations in providing data to the Company have not been met. Ownership layers were not provided in a timely manner in the preparation of the planning inventory. The Company was able to deal with these problems in a satisfactory manner to avoid plan delays. Recommendation 7 in Section 3.3.5 addresses the need for MNR to ensure the required information is provided as required by the FIM.

Silviculture

A sampling of all types of eligible silviculture work completed during the term was verified on maps/stand listings and was observed in the field by the audit team. Treatments included mechanical and chemical site preparation, seeding, planting and tending. Natural renewal treatments were also viewed. As there were no significant pest outbreaks during the 2001-2006 term, Norampac did not participate in a pest control program. However, some monitoring of beetle/root rot-affected jack pine trees in the Jellicoe area was done by company staff and MNR specialists. This outbreak was considered limited in extent (~150 ha).

Silviculture activities were carried out as reported, with funds from the Renewal Trust Account. Most treatments were effective with some exceptions, as described in the Renewal, Tending and Renewal Support section in this report. As a result, in that section, the audit team developed some recommendations and suggestions aimed at improving the renewal program on the Lake Nipigon Forest.

Class A, B and X, Y and Z lands

The SFL for the Lake Nipigon Forest contains a section that stipulates the silvicultural standards the Company must meet. At the time of SFL signing, previously harvested areas on the Lake Nipigon Forest were classified according to date of harvest and renewal activities completed. Specifically, Class A and B lands include all areas harvested prior to and after April 1, 1994 on the former Lake Nipigon Forest FMA area. Class A and B lands are further subdivided based on silviculture treatments (or lack thereof) that had occurred. Class X, Y, and Z lands refer to areas harvested on the former Auden Forest, the former Nipigon Management Unit and on the former Steel River Management Unit on or after April 1, 1995 according to renewal activities that had occurred. A map of the Class A, Y and Z land was produced and included with the SFL document.

According to the SFL, Norampac must meet silviculture standards on Class B, Y and Z lands. It is interesting to note that although a map is required for Class A lands there is no requirement that the company meet silviculture standards; however, the opposite is true for Class B lands.

The original A, Y, Z map and area summaries were produced by Norampac for this audit (A=8,130 ha, Y=328 ha, Z=7,631 ha). Norampac also produced a summary of activities completed to date by classification, including:

- Almost one half of Class A lands have been declared FTG.
- A majority of Y lands has received one or more silviculture treatments and about half is now FTG.
- A portion of Z lands have been tended to date and over 15% is currently FTG.

Some of these treatments were confirmed during the field audit. FTG areas were also viewed. Note that the A, Y and Z and FTG figures will likely be bolstered when the remainder of the 2005 assessments is incorporated into the GIS.

Free-to-Grow

According to the Trends Analysis Report, Norampac completed 7,636 ha of FTG assessment (76% of planned) during the audit term; about 55% was deemed FTG (Table 10). It should be noted that the full results of the 2005 assessment were not available at the time the Trend Analysis Report was written; when the additional amount is added, Norampac will have completed slightly more assessment than planned.

Of the 4,109.6 ha assessed for FTG from 2001-2005, 61% was deemed FTG (i.e. regeneration success) and about 73% of the FTG area was a silviculture success. Therefore, for areas declared FTG, about three-quarters of the treatments applied resulted in the desired forest unit; the remainder met FTG standards for other forest units (Figure 20). This statistic gives a good indication of Norampac's ability to meet the desired future forest condition on the Lake Nipigon Forest. At the forest unit/treatment level, it is apparent that intensive and basic treatments to a spruce upland forest condition are more problematic than similar jack pine treatments (Table RPFO-9). This type of information would be useful to Norampac when modeling post-harvest silviculture trends in the next FMP.

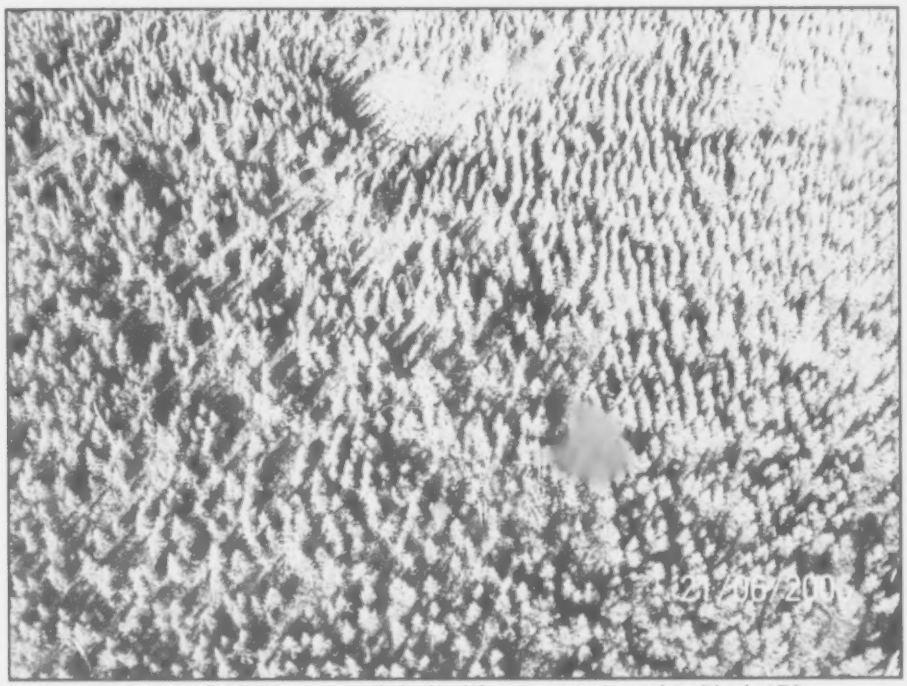


Figure 20. Successful FTG area and desired forest unit viewed in Block 150.

4.0 Summary of Conclusions and Recommendations

Commitment

Norampac is a joint-venture company owned by Cascades Inc. (50%) and Domtar (50%). Norampac operates based on two fundamental values: a social conscience and respect of environmental resources. The company meets it social commitment through producing recyclable products; achieving environmental ISO accreditations, investing in research and providing donations to charitable groups and other socially responsible organizations.

Domtar has modern vision and mission statements that communicate its long-term pledge to becoming a leader in "responsible, progressive and sustainable forest management". The overarching corporate policy statement "*A forest for all, for always*" effectively captures its commitment to sustainability.

MNR Forest Division has a vision and mission statement addressing their commitment to SFM by "...providing balanced environmental, social and economic benefits now and for the future."

Interviews with Company and MNR staff, field visits and a review of relevant forest management documentation confirmed that they are familiar with and committed to the vision, mission and policy statements in place.

Public Participation

The Nipigon East Area LCC was established in 1995 and covers a large geographic area with a number of communities including two First Nation communities. The number of members is relatively large at 16 and most groups have designated alternates to ensure representation and attendance at meetings. This effective use of alternates means that all meetings are well attended. The LCC has done a good job of representing the diverse interests over a large geographic region. The LCC is interested and engaged in the forest management activities that are undertaken within this area, and is well supported by the Company and the MNR staff in the Nipigon District. The audit team compliments the LCC on a job well done.

There are five Aboriginal Communities within or adjacent to the Lake Nipigon Forest: Sand Point First Nation, Pays Plat First Nation, Red Rock Indian Band, Animbiigoo Zaagi'igan Anishinaabek and Biinjitiwaabik Zaaging Anishinaabek. All of the Aboriginal communities opted for the FMNCP. During the planning process Poplar Point Ojibway requested to participate and was subsequently invited.

MNR met regularly with Red Rock Indian Band, Animbiigoo Zaagi'igan Anishinaabek and Biinjitiwaabik Zaaging Anishinaabek forestry staff to implement forest operations and compliance. All of the Aboriginal communities were invited by MNR to sit on the planning team for the 2006-2011 FMP and all accepted and had representation. MNR provided funding to Sand Point First Nation, Animbiigoo Zaagi'igan Anishinaabek and Pays Plat First Nation for values mapping, which met one of the recommendations from the 2001 IFA.

Two recommendations were directed to the MNR to ensure that forest management planning notices to Aboriginal communities meet the requirements of the Forest Management Planning Manual.

Forest Management Planning

The planning team functioned effectively, planning team meetings were well attended and minutes were thoroughly documented. Several findings on planning team activities were identified by the audit team that required suggestions or recommendations. A suggestion to the MNR dealt with the high number of alterations in the 2006-2011 FMP and two recommendations were directed to the MNR and Norampac regarding the proposed road link between the Armstrong and Lake Nipigon Forests and the need to have issues dealt within the planning process to ensure it remains a public process.

A repeat finding from the 2001 IFA is directed at MNR to provide updated and accurate values information to the Company.

The 2006-2011 FMP management alternatives were analyzed with SFMM, with results and input assumptions discussed in the FMP text and the Analysis Package. The FMP provided an excellent discussion of the assessment of forest sustainability and objective achievement between management scenarios. A suggestion for several improvements in preparing for the next FMP is given.

The audit team noted that the 2006-2011 FMP included a set of strategies to allow for an assessment of the impacts of Ground Water Recharge Zones (GRZs) on operations as well as to develop methodologies for the identification and verification of potential GRZs. The issue of GRZs was identified as a High Priority Aspect. Three suggestions and one recommendation are directed to Norampac to address deficiencies identified in silvicultural planning. The recommendation specifies that the Company must provide a thorough description of the monitoring and assessment program in the FMP. The caribou guidelines have been in effect from 1999. Although the audit team has been informed that new landscape guidelines are being developed and that caribou guidelines are to be enveloped therein, very few changes have occurred to the manner in which forest management planning considers woodland caribou. A recommendation is given to MNR to ensure that current science respecting woodland caribou is included in the development of the landscape guide.

The review and approval of the 2006-2011 FMP followed the process as outlined in the 1996 FMPM. The required alterations were well done and professional. However, the audit team noted that the high number of alterations, although not out of the norm for plans in this region, represent a significant workload both in generating the alterations and in addressing them. The audit team observed that the planning process has become so complicated that it is no longer possible for a single plan author to produce a plan that will meet the approval of all those who review it. For this reason, a suggestion is given to have MNR evaluate the roles, responsibilities and training of planning and review team members to reduce the number of required alterations.

During the implementation of the 2001-2006 FMP there were a total of 40 amendments; 30 were categorized as administrative, nine were categorized as minor and one was categorized as major. The categorization for all amendments was found to be appropriate. The master list of amendments was complete and amendment record binders were well prepared and readily available. The LCC meeting minutes indicated that amendments were reviewed with the Committee as required. Two recommendations dealing with the required amendment distribution and notices to aboriginal communities were directed to MNR.

Plan Implementation

AOC prescriptions were well implemented with boundary marking accurately performed. Where AOC incursions had occurred, compliance inspections had accurately reported the incursions. All harvest areas viewed in the field were approved in the FMP and AWS. Field observations were consistent with compliance inspection reports.

Problems observed with utilization and slash management had been identified in previous audits. There is some evidence of progress in slash management but a better job needs to be done. As a result a recommendation is directed to both Norampac and MNR to improve utilization, tree retention and slash management practices. A suggestion was directed to Norampac dealing with improving the handling of chipper debris at landings.

Most renewal and tending prescriptions completed during the audit term were consistent with the FMPs, AWSs and ARs. Most treatments viewed were also appropriate and effective and many areas treated during the audit term appear to be headed towards meeting FTG targets. Some exceptions dealing with site potential and occupancy and the application of CLAAG warranted two suggestions. Compliance related to renewal and tending during the audit term was very good.

Access planning for primary and secondary roads was comprehensive and met the requirements of the FMPM. All roads examined by the audit team were placed according to the plan, or moved through amendments. The vast majority of roads were well constructed but a suggestion is given to Norampac to continue reducing the environmental impacts associated with road building. A recommendation was directed to both MNR and Norampac to ensure proper decommissioning of inactive aggregate pits.

Systems Support

Domtar's comprehensive EMS and thorough AWS meetings held throughout the year are effective mechanisms conveying new information and requirements to Overlapping License holders and contractors. A recommendation is given to have the MNR allocate more resources (i.e. staff time) to compliance and monitoring, the supply of values information and to ensure silvicultural effectiveness monitoring is completed.

Monitoring

Shortcomings in compliance reporting and meeting timelines were identified and a recommendation was directed to both Norampac and MNR. FTG assessments completed during the term were good but a suggestion is given to consider completing aerial pre-tending and FTG assessments during or near the end of the leaf-on period to improve accuracy. The amount of FTG assessment forecast and completed in the 2001-2006 period was not sufficient when compared to harvest levels from the previous two five-year periods. Fortunately, the 2006-2011 FMP forecasts over 31,000 ha of assessments to be completed during the 2006-2011 term. A recommendation is directed to MNR to ensure that these surveys are completed as scheduled and to Norampac to complete the forecasted assessments. This will confirm that one of the High Priority Aspects identified prior to the audit (i.e. was the FTG data sufficient and was it lagging behind relative to the entire forestland base) will have been addressed.

Although funding has been available since 2004, MNR have not completed silviculture effectiveness monitoring on the Lake Nipigon Forest to date which received a recommendation. Norampac received a recommendation to make certain that the monitoring assessment program is adequate for assessing the effectiveness of all silviculture treatments.

Annual report content was in accordance with requirements of the 1996 FMPM and the phase-in requirements of the 2004 FMPM. Annual report text provided good summaries of operations on the Forest during the year.

The final RPFO was not submitted until almost three years behind schedule. The 2004 FMPM no longer requires the development of an RPFO. Therefore MNR and Norampac must ensure the Year-Ten Annual Report which Norampac is required to produce by November 15, 2006 for the 2001-2006 FMP is completed, reviewed and accepted in time.

Achievement of Management Objectives and Forest Sustainability

The audit team reviewed the status of the management objectives associated with the 1996-2001 Lake Nipigon TMP, the 1997-2002 Auden Forest TMP and the 2001-2006 Lake Nipigon FMP. A review of the progress towards meeting the objectives is stated and the associated recommendations and/or suggestions are listed where applicable.

The 1996-2001 RPFO provided an excellent and thorough historical background to the development of the current forest condition on the Lake Nipigon Forest. In addition, a text description of the changes in forest condition during the 1996-2001 (Lake Nipigon Forest) and 1997-2001 (Auden Forest) plan period were provided. The RPFO identified the effect of limited logging and fire suppression on the age-class distribution of the Forest thereby creating an "age-class gap".

The Trend Analysis Report was submitted in time and met the requirements of the IFAPP. Lower actual harvest volumes versus forecasted volumes as well as a decrease in the actual yield is accounted for by underutilization of the hardwood and lower than expected salvage volumes during the audit period.

The amount of forest regenerated when compared to the forest area harvested over the past 15 years is reasonable with only about 17,000 ha difference which represents approximately an area equal to 3 years of harvest on the Lake Nipigon Forest. This is a reasonable amount of "lag-time" similar to other forests in the boreal forest. The 15 years of data revealed a decline in the FTG success rate over the past 15 years for which there is no readily apparent reason. Norampac must determine the reason for the decline and resolve the downward trend if it is true.

The Trend Analysis Report provides a thorough assessment of forest sustainability. Similar to the concluding statement in the Trend Analysis Report, based on the information given, the field visits and numerous interviews, the audit team believes the Lake Nipigon Forest is being managed in a sustainable manner, with the exceptions as identified in the audit report.

Contractual Obligations

Based on the considerable input the audit team received on the issue of wood flow and allocations, the complexities of past and existing business agreements in place, the reality of economic wood flow and because of the many changes occurring in the forest industry at this time, the audit team believes the entire Appendix E approach to wood supply commitments would benefit from a review. One suggestion and two recommendations are given to deal with the issue.

The 2001 IFA and associated action plans and status report were all late. One suggestion to lengthen the time to prepare an action plan is given and both auditees are reminded to meet the IFA status report submission dates on time. The action plan and action plan status report prepared by the Company and MNR were well done and met the requirements but several actions associated with the IFA recommendations are not fully completed and are identified in a recommendation.

The MNR, Aboriginal communities and Norampac have been very successful identifying and achieving a more equal participation by Aboriginal communities in the benefits derived from the Lake Nipigon Forest. Four out of five First Nations are actively involved in planning, harvesting and renewal activities. Most attribute the success to partnerships, keeping small and experience. A recommendation to continue efforts to provide employment is given and a best practice commends Norampac Inc., the Ministry of Natural Resources, Animbiigoo Zaagi'igan Anishinaabek, Biinjitiwaabik Zaaging Anishinaabek and the Red Rock Indian Band for their successful efforts in helping the District Manager address Condition 34 of the Declaration Order.

Conclusion

The audit team believes that with the exceptions noted in the audit report, management of the Lake Nipigon Forest was in compliance with the legislation, regulations and policies that were in effect during the term of the audit. The Lake Nipigon Forest was managed in compliance with the terms of SFL number 550412 held by Norampac. Although timber volumes and other values such as wildlife habitat will fluctuate over time, the Forest is being managed sustainably as defined by the CFSA.

Recommendation 27: Based on the outcome of this audit and performance with respect to its contractual obligations, the audit team recommends the Minister extend the term of the Norampac Inc. Sustainable Forest Licence 550412 for a further five years.

Table 18 provides a summary by responsible party of the number of recommendations, suggestions and best practices identified during the audit. A complete list is provided in Table 19.

Table 18. Summary of recommendations, suggestions and best practices by responsible party.

	Norampac	MNR	Norampac and MNR	Total
Recommendations	6	11	10	27
Suggestions	11	5	2	18
Best Practices	-	-	1*	1

*Animbiigoo Zaagi'igan Anishinaabek, Biinjitiwaabik Zaaging Anishinaabek and the Red Rock Indian Band were also recognized in the Best Practice.

Table 19. Summary of recommendations, suggestions and best practices.

Principle 1: Commitment	
None	
Principle 2: Public Participation	
Recommendations	
1	The Ministry of Natural Resources must ensure that forest management planning notices to Aboriginal communities are placed in the Aboriginal media identified in the Terms of Reference of the next forest management plan.
2	The Ministry of Natural Resources must ensure that the Notice of Annual Work Schedule Public Inspection and aerial herbicide program notices to Aboriginal communities meet the requirements of the Forest Management Planning Manual with respect to notices in the Aboriginal media.
Suggestions	
1	The Ministry of Natural Resources should maintain accurate and complete records of consultation with Aboriginal communities in order to be able to demonstrate that requirements of the Forest Management Planning Manual are being met.
2	The Ministry of Natural Resources should ensure values collection is finalized and supported by Pays Plat First Nation.
Principle 3: Forest Management Planning	
Recommendations	
3	The Ministry of Natural Resources and Norampac Inc. must ensure the Terms of Reference for the next forest management plan is approved prior to the issuance of the Invitation to Participate.
4	The Ministry of Natural Resources and Norampac Inc. must review plan issues at the time the Terms of Reference is being drafted and assign appropriate resources to ensure that issues are dealt with during the planning process.
5	The Ministry of Natural Resources must inform the public of the results of the studies conducted and the decision with respect to the proposed road link between the Armstrong and Lake Nipigon Forests.
6	Norampac Inc. must include all required text in the "Geology, Soils and Sites" and "Historic Forest" sections of the next forest management plan.
7	The Ministry of Natural Resources must ensure that Natural Resources Values Information System information is provided for Forest Management Plan and Annual Work Schedule preparation, as described in the Forest Information Manual. *(Repeat recommendation from 2001 IFA.)*
8	Norampac Inc. must ensure that all required text regarding the monitoring and assessment program is included in future forest management plans.
9	The Ministry of Natural Resources must ensure that the new Landscape Guide include current science respecting woodland caribou consistent with the spirit and intent of the Declaration Order MNR-71.

Continues on next page.

Table 19 continued.

Principle 3: Forest Management Planning *continued*	
10	The Ministry of Natural Resources must ensure that amendment notices to Aboriginal communities meet the requirements of the Forest Management Planning Manual with respect to notices in the Aboriginal media.
11	The Ministry of Natural Resources must ensure that all amendments are distributed in a manner consistent with the requirements of the Forest Management Planning Manual.
12	The Ministry of Natural Resources and Norampac Inc. must ensure Forest Operation Prescription changes are appended to Annual Work Schedules.
Suggestions	
3	The Ministry of Natural Resources should develop a system or procedure to assist in consistently updating the District mailing list.
4	Norampac Inc. should, during the preparation of the next forest management plan: • Review the assessment of areas set aside from harvesting and incorporate existing reserves into the planning inventory to provide the model with a more accurate reflection of areas reserved from harvesting. • Review succession rules to ensure agreement between pre- and post-succession volumes.
5	Norampac Inc. should revise Silvicultural Ground Rules such that acceptable species lists include those species that have a high potential for being on site post-harvest.
6	Norampac Inc. should consider re-instating target stocking or updating the measure of site occupancy in the Silvicultural Ground Rules to correlate with the Well-Spaced Free-Growing Regeneration Manual (i.e. list the target and minimum number of well-spaced free-growing trees).
7	Norampac Inc. should include all required renewal support information in future forest management plans.
8	The Ministry of Natural Resources should evaluate the roles, responsibilities and training of planning and review team members to reduce the number of required alterations.
Principle 4: Plan Implementation	
Recommendations	
13	The Ministry of Natural Resources and Norampac Inc. must improve utilization, tree retention and slash management practices. *(Repeat recommendation from previous IFA.)*
14	The Ministry of Natural Resources and Norampac Inc. must ensure that all inactive aggregate pits are properly decommissioned.
Suggestions	
9	The planning team members (both Norampac Inc. and Ministry of Natural Resources) should review the pattern of past harvests and ensure that the harvest patterns and allocations take into account economic factors to the extent possible in developing the next forest management plan.
10	Norampac Inc. should find ways to improve the site rehabilitation of landings that are covered with chipper debris.
11	Norampac Inc. should implement an artificial renewal program aimed at maximizing site potential and occupancy, particularly on mixedwood sites.
12	Norampac Inc. should make sure that harvest operators follow direction in the Careful Logging Implementation Manual, particularly when advance growth is sparse and seeding potential is low.
13	Norampac Inc. should review its road building standards with the aim of reducing further the environmental impacts related to road construction, with the acknowledgement that considerable progress has occurred in the last decade.

Continues on next page.

Table 19 continued.

Principle 5: Systems Support	
Recommendation	
15	Corporate Ministry of Natural Resources must review its priorities and allocation of human resources to deliver its forest management program.
Principle 6: Monitoring	
Recommendations	
16	The Ministry of Natural Resources and Norampac Inc. must ensure that timelines for reporting under the Forest Operations Inspection Program are met and that all inspections are reported as required.
17	Norampac Inc. must ensure it meets the 2006-2011 FMP forecasts for silviculture assessments and the Ministry of Natural Resources must closely monitor Norampac Inc.'s progress in completing the forecast silviculture assessment program for the 2006-2011 term.
18	The Ministry of Natural Resources must complete silviculture effectiveness monitoring on the Lake Nipigon Forest.
19	Norampac Inc. must make certain that the monitoring assessment program is adequate for assessing the effectiveness of all silviculture treatments.
20	The Ministry of Natural Resources and Norampac Inc. must ensure that the Year-Ten Annual Report for the 2001-2006 Forest Management Plan will be produced, reviewed and accepted according to the schedule provided in the Forest Management Planning Manual.
Suggestions	
14	Norampac Inc. should consider completing aerial pre-tending and free-to-grow assessments during or near the end of the leaf-on period.
15	Norampac Inc. should formalize assessments of aerial tending projects, add quality control stipulations to aerial tending contracts and complete formal surveys of ground tending projects, as per contract specifications.
16	Norampac Inc. should ensure that the conclusions and recommendations in the Year-Ten Annual Report for the 2001-2006 Forest Management Plan are clearly identified within the text and summaries.
Principle 7: Achievement of Management Objectives and Forest Sustainability	
Recommendation	
21	Norampac Inc. must determine the reason for the decline in the free-to-grow success rate over the past 15 years.
Principle 8: Contractual Obligations	
Best Practice	
1	Norampac Inc., the Ministry of Natural Resources, Animbiigoo Zaagi'igan Anishinaabek, Biinjitiwaabik Zaaging Anishinaabek and the Red Rock Indian Band are to be commended for their successful efforts in helping the District Manager address Condition 34 of the Declaration Order.
Recommendations	
22	The Ministry of Natural Resources must determine if the Appendix E approach to wood supply commitments needs to be replaced with a different process.
23	Norampac Inc. must complete the Memoranda of Agreements as stipulated in Appendix E of the Sustainable Forest Licence.
24	The Ministry of Natural Resources and Norampac Inc. must meet the Independent Forest Audit Status Report submission date.

Continues on next page.

Table 19 continued.

	Principle 8: Contractual Obligations *continued*
25	The Ministry of Natural Resources and Norampac Inc. must complete the action items arising from the recommendations in the 2001 Independent Forest Audit as follows: • There is no Memorandum of Agreement in place with Neenah Paper. • Slash piling is still inconsistent. • Annual Report submission dates by the Norampac Inc. and the review and correction deadlines by the Ministry of Natural Resources still need improvement. • Audit findings were incorporated into current operations and future planning as required, but the requirement to include an audit summary and progress report in the Annual Report was overlooked. • The definition of what constitutes a permanent stream and water crossing is to be included in the revised access roads and water crossing guide and the revised fish habitat guide being prepared.
26	The Ministry of Natural Resources and Norampac Inc. must continue efforts to identify and implement ways of achieving more equal participation of Pays Plat First Nation in the benefits provided through forest management planning.
Suggestions	
17	The Ministry of Natural Resources and Norampac Inc. should incorporate the principles listed in the report Towards Resolving Utilization Issues: A Process to Manage Unutilized Fibre (1999) to resolve the Appendix E wood supply commitments.
18	Corporate Ministry of Natural Resources should consider lengthening the time to prepare an action plan report from two months to six months.
Conclusion	
The audit team believes that with the exceptions noted in the audit report, management of the Lake Nipigon Forest was in compliance with the legislation, regulations and policies that were in effect during the term of the audit. The Lake Nipigon Forest was managed in compliance with the terms of SFL number 550412 held by Norampac. Although timber volumes and other values such as wildlife habitat will fluctuate over time, the Forest is being managed sustainably as defined by the CFSA.	
Recommendation	
27	Based on the outcome of this audit and performance with respect to its contractual obligations, the audit team recommends the Minister extend the term of the Norampac Inc. Sustainable Forest Licence 550412 for a further five years.

Appendix A:
Comparison and Trend Analysis of Planned versus Actual Forest Operations Report

NORAMPAC INC.
LAKE NIPIGON FOREST SFL # 550412
INDEPENDENT FOREST AUDIT

COMPARISON AND TREND ANALYSIS OF PLANNED VERSUS ACTUAL FOREST OPERATIONS

Norampac
Red Rock Division

REGISTERED PROFESSIONAL FORESTER 1957 RYAN PETRAUSKAS ONTARIO

Prepared By: _____ RPF Seal: _____

Domtar

Dated: June 7, 2016

Table of Contents

1.0 Introduction 3
2.0 Trend Analysis Text and Tables 4
2.1 Summary of Total Area Under Management 4
2.2 Description of Forest Units 7
2.3 Summary of Planned and Actual Harvest Volumes 11
2.4 Summary of Planned and Actual Harvest Areas 14
2.5 Summary of Managed Productive Forest By Forest Unit 16
2.6 Summary Report of Renewal, Tending and Protection Operations 35
2.7 Harvested Area Successfully Regenerated 40

Appendix I: Summary of the RPFO for the 1996-2001 FMP 43
1.0 Highlights of Summary and Evaluation of Operations 44
2.0 Assessment of Forest Sustainability 46
3.0 Achievement of Plan Objectives 47
4.0 Audit Recommendations and Suggestions 48

Appendix II: Evaluation of Progress on Implementation of the 2001-06 FMP 49
1.0 Synopsis of Operations 50
2.0 Achievement of Plan Objectives 51
3.0 Assessment of Forest Sustainability 63

1.0 Introduction

This Comparison and Trend Analysis of Planned versus Actual Forest Operations for the Lake Nipigon Forest (Trend Analysis Report) has been prepared and certified by a Registered Professional Forester, in accordance with the direction provided in Appendix C of the 2006 Independent Forest Audit Process and Protocol (IFAPP). The 2006 Independent Forest Audit (IFA) covers the period from April 1, 2001 to March 31, 2006 on the Lake Nipigon Forest in particular, but is also based on planned and actual activities of previous Timber Management Plans (TMP) or Forest Management Plans (FMP). For the sake of brevity in subsequent text, these terms shall be considered interchangeable.

The Lake Nipigon Forest is located within the Ministry of Natural Resources administrative district of Nipigon, which in turn is administered regionally by the Northwest Region office in Thunder Bay. Under Sustainable Forest Licence (SFL) 550412, Norampac Inc. is the prime licence holder for the Lake Nipigon Forest. The issuance of the SFL to Norampac Inc. on December 16, 2002 addressed the licensing of an amalgamated management unit (see next paragraphs) called the "Lake Nipigon Forest" and the establishment of Norampac Inc., through a joint business partnership between Domtar Inc. (Domtar Packaging) and Cascades.

In April of 1999, Domtar Inc. submitted a proposal to the MNR to amalgamate a number of former management units (or portions thereof) with the Lake Nipigon Forest. These management units included the former Auden Forest, the former Onaman Crown Management Unit (CMU), the Gravel River portion of the former Steel River CMU, and the Orient Bay Peninsula and Kitto & Kilkenny Township portion of the former Nipigon CMU. The amalgamated management unit is called the "Lake Nipigon Forest". A detailed description of the management unit can be found in Section 2.0 of the Lake Nipigon Forest 2006-11 FMP.

The amalgamated Lake Nipigon Forest was designated as a new management unit March 22, 2001 (effective April 1, 2001) to correspond with the implementation of the 2001-06 FMP. On January 22, 2003, following the company surrendering the Auden SFL (No. 542254) and the Lake Nipigon Forest deemed SFL (No. 500900), SFL License No. 550412 was issued.

This report covers managed Crown land only although the achievement of some management objectives and forest sustainability depend on the contributions of all land ownerships (including parks, conservation reserves, and patent land, for example). This report includes the seven Trend Analysis tables and associated text, as detailed in the IFAPP. Information relating to three planning terms has been summarized for comparative purposes - the "Current Term" (from April 1, 2001 to March 31, 2006), plus the two preceding FMP terms (1991-96 and 1996-2001). Where data has been readily available, some tables include pertinent information from the 2006-11 FMP for comparative purposes.

Reference is made in Appendix C to Criteria 7.4 of the IFAPP, which pertains to the assessment of management objectives and forest sustainability. A summary of the highlights of the most recently completed Report of Past Forest Operations, as they pertain to this criteria for the period from April 1, 1996 to March 31, 2001, is provided in Appendix I.

With respect to the current plan, the 2005-06 Annual Report which will contain the additional Year Ten reporting requirements outlined in the revised 2004 Forest management Planning Manual (FMPM) for the last year of the plan, is not due and will not be submitted until November 2006. Although much of the information necessary to prepare the Year Ten report is not yet available, an evaluation of the implementation of the 2001-06 FMP has been presented in Appendix II of this Trend Analysis Report. Appendix II includes a list of the 2001-06 FMP objectives and a review of the progress towards their achievement.

It has been necessary to prepare most tables in this report on an annualized basis. Firstly, as mentioned above, most of the reporting information relevant to the last year of the 2001-06 FMP has not been summarized at this early date, and most of the 5-year data for this term is not yet available. Secondly, for the purposes of preparing the 2001-06 Lake Nipigon Forest FMP for an amalgamated Forest, it was necessary to truncate the operational portion of Auden Forest 1997-2002 FMP by one year. In preparing

the tables for this report, the pertinent data for the 4-year term of the Auden Forest TMP (1997-2001) was annualized and added to the 5-year (1996-2001) annualized data for the Lake Nipigon Forest, to account for the amalgamation of two management units prepared under different planning cycles. Conversely, the 1991-96 Auden Forest TMP was extended for a one year period, through the implementation of a contingency plan. All Report of Past Forest Operations (RPFO) summaries for this period relate to the 6-year period from 1991 to 1997.

It is noteworthy to point out that significant salvage harvest efforts following wildfire events were undertaken during both the 1996-2001 and the 2001-06 FMP period. In 1999, Nipigon Fire 12 burned approximately 30,000 hectares within the Lake Nipigon Forest. Initial salvage operations within Nipigon Fire 12 occurred in the fall of 1999 and continued into the last year of the 1996-2001 FMP. Much of this area (4,284 hectares) was brought forward into the 2001-06 FMP (Table FMP-22a), to allow for the continuation of salvage harvest operations should these areas not be completed during the 1996-2001 plan term. Subsequently, additional area was approved through a number of amendments to the 2001-06 FMP (Coded Amendment #'s 9, 15, 17 and 21), totaling 8,169 hectares of planned salvage harvest in Nipigon Fire 12. During the summer of 2003, approximately 690 hectares were burned in Nipigon Fire 58. The approval of a minor amendment (Coded Amendment # 28) added approximately 620 hectares of planned salvage harvest area to the 2001-06 FMP.

Other natural disturbances have had an impact on forest management activities during the 2001-06 period. A snow storm followed by strong winds swept across the area north of Lake Nipigon on October 24, 2001. The resulting damage was geographically widespread, from Sioux Lookout in the west, north as far as the edge of the Area of the Undertaking, and stretched across the northern portion of the Lake Nipigon Forest. Heavy accumulations of wet snow and ice in the upper portions of mature trees caused significant blowdown and snapping of treetops at various heights, and to differing degrees of severity. Two administrative amendments (Coded Amendment #'s 22 & 23) and one minor amendment request (Coded Amendment # 25) proposing salvage operations affecting a total of 3,804 hectares in these blowdown areas, were approved in 2002.

2.0 Trend Analysis Text and Tables

2.1 Summary of Total Area Under Management

Trend Analysis Table 1, accompanied by the supporting bar graph, documents the total area under management over four consecutive planning periods for the Lake Nipigon Forest. Since the values are readily available from the recently approved Lake Nipigon Forest 2006-11 FMP, they have also been included in Table 1 in the "Future" column.

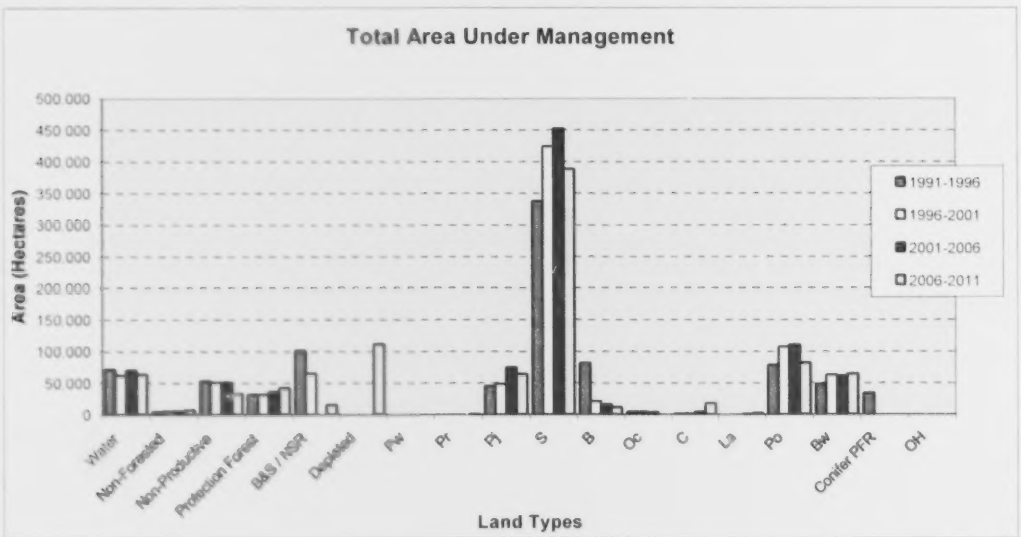
The sources of information for this table and chart are footnoted. For the first two planning periods (1991-96 and 1996-2001), the areas reported in Table 4.8.2 of the former Lake Nipigon Forest FMP were simply added to the areas associated with the Auden Forest FMP. The irregularity in the Auden Forest planning terms (April 1, 1996 to March 31, 1997) is due to the fact that the preparation of the Auden Forest 1996-2001 FMP was delayed by one year, at the request of the MNR, to ease the planning workloads in the Nipigon District and the Northwest Region. A contingency plan was prepared by Domtar to cover the one-year period.

The 1991-96 and 1996-2001 FMPs for the former Lake Nipigon Forest were based on 1975 Forest Resource Inventory (FRI) data. The 1996-2001 FMP was the first plan to utilize digital landbase GIS data on the Forest and explains in part, some of the area differences from the previous term which were manually derived. This is evident in the changes in water and non-productive forest areas reported in Trend Analysis Table 1 for that period. More specifically, the differences in water and non-productive forest land resulted from the incorporation of all exclusion areas into the digitized GIS landbase. Exclusion areas were measured and drafted manually when the FMA was originally established. When this data was transferred to digital format on the GIS, errors in this manual work were identified. Similarly, the 1991-96 and 1997-2002 FMPs for the former Auden Forest were based on 1985 FRI data. The latter plan was also the first FMP for the Auden Forest to utilize digital GIS data, and as a result, some area figures were slightly different form the manually derived values in the 1991-96 plan.

2006 Independent Forest Audit
Table 1 - Summary of Total Area Under Management

Past and Current Plans - Crown Managed
MU: **Lake Nipigon Forest**

Land Type		Plan Term	Area in hectares			
			Past Plans		Current	Future
			1991-1996[1]	1996-2001[2]	2001-2006[3]	2006-2011[4]
Water			70,967	61,470	69,864	63,368
Non-Forested Land			3,753	4,684	5,340	6,773
Forested						
Non-productive			52,729	50,277	50,346	32,991
Productive						
Protection			31,280	31,407	35,954	42,011
Production Forest						
	B&S / NSR		100,826	64,691	-	14,850
	Depleted		-	-	-	111,217
	Forest Stands by Working Group					
	Pw		-	-	-	27
	Pr		-	110	129	417
	Pj		45,088	48,358	74,248	63,868
	S		337,210	423,379	451,232	388,001
	B		81,235	20,935	15,872	11,065
	Oc		3,651	4,259	3,273	
	C		721	727	4,068	17,479
	La		151	148	243	1,895
	Po		77,904	106,636	110,133	81,425
	Bw		47,703	62,482	61,067	64,064
	Conifer PFR		33,318	-	-	
	OH		4	8	9	94
Total Production Forest			727,811	731,733	720,274	754,401
Total Forested Land			811,820	813,417	806,574	829,403



Sources
1. Table 4.8.2 from the Lake Nipigon Forest and Table 4.8.1 from the Auden Forest 1991-1996 TMPs
2. Table 4.8.2 from the Lake Nipigon Forest 1996-2001 TMP and the Auden Forest 1997-2002 TMPs
3. Tables FMP-1 and FMP-2 from the Lake Nipigon Forest 2001-2006 FMP
4. Tables FMP-1 and FMP-2 from the Lake Nipigon Forest 2006-2011 FMP

The 2001-06 FMP for the newly amalgamated Lake Nipigon Forest was also based on 1976 FRI for the pre-amalgamated Lake Nipigon Forest, and 1985 FRI for the pre-amalgamated Auden Forest. Photography had been taken in 1995 for a new FRI, but the final usable product had not been completed for use in the 2001-06 plan. Depletions for both inventories were updated in 1999, incorporating areas

harvested or burned and projected harvest areas by 2001. Also included was the FRI for the Kitto-Kilkenney and Orient Bay portions of the former Nipigon CMU (updated in 1995), the Gravel River Block of the Steel River CMU and the western portion of the Onaman CMU.

One particular issue associated with the dated FRI was the large amount of area incorrectly represented as B&S or as the balsm fir working group. The Lake Nipigon Forest 2001-06 FMP planning team knew that much of the B&S areas were in fact young, healthy growing forest and that much of the balsam fir stands had succeeded naturally or had converted through spruce budworm devestation, into new and different forest units. In preparation of the 2001-06 FMP, Domtar's photo interpreter analyzed the extent of large areas of B&S and affected balsam fir stands and retyped the forest units of stands that had reached Free-to-Grow (FTG) status or had converted, accordingly.

Due to time limitations, not all areas of recent cutover were able to be retyped in this manner. Outstanding B&S areas were represented based on the previous forest unit designation and the subsequent silvicultural treatments. For the purpose of long-term strategic modeling (using the Strategic Forest Management Model – SFMM), all B&S and depleted areas were represented as growing forest. The FMP tables were prepared such that all land/stand classifications were summarized in a consistent manner. Thus, Tables FMP-1 and FMP-2 were prepared to reflect the SFMM modeling assumptions (with no B&S or depleted areas reported), rather than reality. The 2006-11 FMP planning team on the other hand, in consultation with regional MNR planning specialists, represented the Depleted and B&S areas differently (more accurately) in SFMM and in Tables FMP-1 and FMP-2.

In preparation for the 2006-26 FMP, the 1995 FRI (for both the SFL and non-Crown lands/Crown land exclusions) was used for the first time. The inventory was updated to incorporate information regarding forest management activities (clearcut harvest areas and natural events). The FRI was further updated to 2006 (the beginning of the planning period) by ageing stands to 2006 ages, distributing B&S areas and recent cutover areas to the appropriate forest units and age classes, and incorporating free-to-grow stands into the landbase. Forecasted changes to the forest description based on the projected operations in the approved 2001-06 FMP were also included in the update.

The reader is referred to Section 1.0, Part One of the "Analysis Package", contained in Appendix AI of the 2006-10 Lake Nipigon Forest FMP, for a detailed description of the preparation of the planning inventory. That section describes how various base themes were updated and compiled, how stand information was updated, including updates to the beginning of the plan term, data preparation for the Strategic Forest Management Model (SFMM) and provides a discussion of management decision information.

Table 1 reveals that some shifts have occurred in areas occupied by the major land types and water, over the 1991-2006 timeframe. Areas were fairly stable from 1991 to 2001, with the exception of a substantial reduction of B&S area in 1996 mainly because of the SFMM modeling assumptions as discussed above. This decrease is also the result of the regeneration/free-to-grow work as well as the changes associated with the transfer to a digital GIS database, as mentioned previously.

The changes evident in the current term (2001-06 FMP) can be attributed primarily to the establishment of new Ontario Living Legacy (OLL) conservation reserves, the amalgamation of the former Lake Nipigon and Auden Forests and the related additions associated with the creation of the SFL (Kitto-Kilkenney, Orient Bay, Gravel River Block and Onaman). The net result is a reduction of Crown Managed productive forest land.

The Ontario's Living Legacy Land Use Strategy, approved in 1999, involved a number of new land use designations within the boundaries of the SFL that were incorporated into the 2001-06 FMP. The majority of new land use areas were conservation reserves, and included: C2247 – Lake Nipigon; C2231 – Jackson Lake; C2223 – Onaman Lake; C2238 – Nipigon Palisades; C2232 – Seahorse Lake; C2234 – Kama Cliffs; and C2225 – Gravel River. The land use intent for these areas has been summarized in Table FMP-7 in the 2001-06 FMP. This OLL reclassification alone, resulted in a reduction in Crown Managed area of approximately 60,700 hectares. In addition to the conservation reserves, four "Enhanced Management Areas" (EMAs) were established as part of the OLL strategy. Although these

areas will require special consideration with respect to forest management activities, they remain classified as Crown Managed forest.

Viewing the most recent landbase summary (2006-11 FMP), some differences are evident in the major land types. The total water area has been reduced, as has non-productive forest area. There is a 4.7% increase in the Crown Managed Total Production Forest area. These relatively minor changes are due primarily to the incorporation of the new FRI, in concert with differences associated with the base feature data provided by the MNR to Domtar for incorporation into the planning inventory (less buffers associated with streams and roads, water, management unit boundary and ownership layers, etc.).

More specifically, in the 2001-06 FMP the Parks and Conservation Reserves boundaries were created through Domtar's GIS based on MNR direction. For the 2006-11 FMP, these boundaries were provided as coverages by MNR. As well, detailed photo interpretation (at the Ecosite level) used for the new FRI resulted in more area that was originally typed as non-forested and non-productive, being reclassified as Productive Forest – both as protection forest and production forest. It should also be noted that there was a reduction in Crown Managed area of 481 hectares as a result of the finalization of negotiations with the Federal and Provincial governments for the expansion of Reserve lands for two First Nations (Partridge Lake Reserve and Sand Point Reserve).

As can be seen on the chart which accompanies Table 1, some shifts in the main working groups have taken place over the 15-year period. The predominant differences between 1991 and 1996 are the reduction of B&S and area from the balsam fir stands, and corresponding increases in other working groups, most notably spruce, and poplar. These changes are a result of the regeneration/free-to-grow efforts as well as utilizing a digital GIS database. In preparation for the 1996-2001 FMP, the digital FRI was updated with cutover data as well as with conversions of B&S from the original landbase to the appropriate "free-to-grow" working group, conversions of recent cutover to new forest units, and conversions of the balsam fir forest units to other forest units due to spruce budworm damage.

Approximately 50% of the balsam fir working group was converted to spruce working group as a result of spruce budworm damage or kill based on the results of a 1994 helicopter survey of previous balsam fir working groups. Smaller increases in all of the other working groups can also be attributed, at least partially, to the major conversion of balsam fir working group, with approximately 24% of the previous balsam fir working group area going to poplar and 16% of the area going to birch.

The differences in areas occupied by individual working groups since 1996 are due to reasons mentioned previously, primarily as a result of a new FRI and changes in the management unit itself (amalgamation and landbase withdrawals). Harvesting, natural disturbance, regeneration, free-to-grow programs, and the manner in which the B&S and depleted areas have been represented in long-term strategic modeling have also contributed significantly to these differences.

2.2 Description of Forest Units

The following tables (Tables 2a, 2b, 2c and 2d) show the transition through four consecutive planning terms from forest units defined essentially by working groups in 1991, to the more ecologically based forest units used in the 2006-11 Lake Nipigon Forest FMP. Since the forest units from the 2006 FMP are readily available, they have been included to better illustrate this trend.

For the sake of space and to avoid duplication, Table 2a has been presented in a manner that shows all forest units that were used during the 1991-96 period. Those that were unique to the former Lake Nipigon Forest are shaded in yellow, those unique to the former Auden Forest are shaded in green, and those that were common to both are not shaded at all. Table 2a describes a relatively simple set of forest units (by today's standards) which for the most part, reflected the main working groups present on the former Auden or Lake Nipigon Forests.

On the former Auden unit, the spruce stands were further separated into three forest units, based on their site type and merchantability criteria. This breakdown could be roughly translated into upland, lowland and unmerchantible spruce forest units. On the former Lake Nipigon Forest, operability was of local

concern and efforts were taken to separate the rugged conifer-dominated PFR stands (CPFR) and the cedar and larch dominated lowland stands (OC). The rest of the forest units (Pj, Bf, Po and Bw) simply reflected the main working groups present on the both forests.

2006 Independent Forest Audit
Table 2a - Description of Forest Units for the 1991-1996 Period
MU: Lake Nipigon Forest

Forest Unit		Forest	Main	Site Type(s)	Silvicultural	FRI Parameters
Code	Name	Type	Working Group	FEC Vegetation Types	System	& Criteria
Spruce 1	Spruce 1	Conifer	Spruce	V24,25,31,33,34,35,36,37,38,15,19,20,30,31,32	clearcut	All black and white spruce stands, site class X and 1 in the spruce working group
Spruce 2	Spruce 2	Conifer	Spruce	V24,25,31,33,34,35,36,37,38,15,19,20,30,31,32	clearcut	All black spruce stands with site class 2 and 3 with height more than 11 metres at age 80. All other conifer stands site class 2 or 3 with >60% stocking and black spruce component of 30% or more and height of 11 metres at age 80
Spruce 3	Spruce 3	Conifer	Spruce			All remaining site class 3 black spruce and other conifer
Sp	Spruce	Conifer	Spruce	V24,25,31,33,34,35,36,37,38,15,19,20,30,31,32	clearcut	All spruce stands, site class X,1,2,3 in the spruce working group
CPFR	Conifer PFR	Conifer	Spruce, Jack Pine, Balsam Fir	V28,30,31,32,33	clearcut	All stands site class X,1,2,3 in the spruce, jack pine and balsam fir working groups classified as PFR
OC	Other Conifer	Conifer	Larch, Cedar		clearcut	Larch or Cedar dominated lowland
Pj	Jack Pine	Conifer	Jack Pine	V17,18,24,29,30,32	clearcut	All jack pine stands, site class X,1,2,3 in the jack pine working group
Bf	Balsam Fir	Conifer	Balsam Fir	V14,16, 24,25,31	clearcut	All balsam fir stands, site class X,1,2,3 in the balsam fir working group
Po	Poplar	Intolerant Hardwood	Poplar	V1,4,5,6,7,8,9,10,11	clearcut	All stands site class X,1,2,3 in the poplar working group
Bw	White Birch	Intolerant Hardwood	White Birch		clearcut	All stands site class X,1,2,3 in white birch working group

Source: Section 4.8.3.1.1 of the Lake Nipigon Forest and Auden Forest 1991-1996 TMPs.
Forest units shaded in green are unique to the Auden Forest TMP.
Forest units shaded in yellow are unique to the Lake Nipigon Forest TMP.
Forest units with no shading are common to both Forests.

Table 2b reflects a significant change from Table 2a, showing the very detailed set of site specific forest units used during the 1996-2001 FMP. These forest units were sorted on a working group basis, but then further refined to reflect Domtar localized site types, species composition and terrain. The 1996 forest units draw upon MNR stand types and Domtar's local site types to help provide a distinction between upland and lowland (Site Type 1) conditions, PFR, and specifically in the former Lake Nipigon unit, the more rugged and often inoperable stands (Site Type 6).

The conifer PFR forest unit (CPFR) listed in Table 2a was dropped in 1996, in favour of individual PFR (Coded "5s") forest units which contained all of the PFR stands classified for each of the major working groups. It was felt that these individual PFR forest units more accurately reflected different rotation age, successional pathways and silvicultural treatments on these sites, rather than grouping them into a conifer PFR (spruce, jack pine and balsam fir) and leaving the rest of the PFR area with each of the other working groups. The rugged (Coded "4s") forest units were also created for each working group in order to identify entire stands or groups of stands growing on rugged terrain that were not likely to be operated.

The 1996-2001 forest units also reflected a different direction with the development of a set of hardwood forest units based upon the relative presence or absence of conifer in the poplar and birch working groups. The forest units reflect product requirements and management regimes over the range of conditions on the Forest. In recognition of the fact that virtually all of the softwood fibre is destined for sawmills initially, one of the primary considerations was the production of an optimum product for sawmills.

2006 Independent Forest Audit

Table 2b - Description of Forest Units for the 1996-2001 Period

MU: Lake Nipigon Forest

Forest Unit		Forest	Main	Site Type(s)	Silvicultural	FRI Parameters
Code	Name	Type	Working Group	(ES =NW ONT. Forested Ecosites)	System	& Criteria
Sp1	Spruce-Conifer	Conifer	Spruce	ES12, 20, 22, 25, 26, 31	clearcut	All upland spruce stands not classified as Sp4 or Sp5
Sp3	Spruce-Lowland	Conifer	Spruce	ES 34, 35, 36	clearcut	Spruce dominated with Domtar site type 1
Sp4	Spruce-Rugged	Conifer	Spruce			Spruce dominated with Domtar site type 6
Sp5	Spruce PFR	Conifer	Spruce			Spruce typed as PFR
Pj1	Jack Pine Conifer	Conifer	Jack Pine	ES13, 14, 20, 25, 26	clearcut	All jack pine stands not classified as Pj4 or Pj5
Pj4	Jack Pine-Rugged	Conifer	Jack Pine			Jack Pine dominated with Domtar site type 6
Pj5	Jack pine PFR	Conifer	Jack Pine			Jack pine stands typed as PFR
Pr1	Red Pine	Conifer	Red Pine			Stands with a red pine working group
Bf1	Balsam Fir	Conifer	Balsam Fir	ES21, 27, 32	clearcut	Balsam fir dominated stands not classified as Bf4 or Bf5
Bf4	Balsam Fir-Rugged	Conifer	Balsam Fir			Balsam fir dominated with Domtar site type 6
Bf5	Balsam Fir PFR	Conifer	Balsam Fir			Balsam Fir stands typed as PFR
Oc1	Other Conifer	Conifer	Larch, Cedar	ES17, 18, 33	clearcut	Larch or Cedar dominated stands
Po1	Poplar Mixed wood	Intolerant Hardwood	Poplar	ES10, 19, 23, 28, 29, 33	clearcut	Poplar working group with component of > 25% spruce and or jack pine and or balsam fir
Po2	Poplar Pure	Intolerant Hardwood	Poplar	ES10, 19, 23, 28, 29, 33	clearcut	Poplar working group with component of < 25% spruce and or jack pine and or balsam fir
Po4	Poplar-Rugged	Intolerant Hardwood	Poplar			Poplar dominated with Domtar Site Type 6
Po5	Poplar PFR	Intolerant Hardwood	Poplar			Poplar stands typed as PFR
Bw1	White Birch-MixedWood	Intolerant Hardwood	White Birch	ES10, 19, 23, 28, 29, 33	clearcut	Birch working group with component of > 25% spruce and or jack pine and or balsam fir
Bw2	White Birch-Pure	Intolerant Hardwood	White Birch	ES10, 19, 23, 28, 29, 33	clearcut	Birch working group with component of < 25% spruce and or jack pine and or balsam fir
Bw4	White Birch-Rugged	Intolerant Hardwood	White Birch			Birch dominated with Domtar Site Type 6
Bw5	White Birch PFR	Intolerant Hardwood	White Birch			Birch stands typed as PFR

Source: Section 4.8.3.1.1.1 of the Lake Nipigon Forest 1996-2001 FMP and the Auden Forest 1997-2002 FMP.
Forest units shaded in green are unique to the Lake Nipigon Forest
Forest units with no shading are common to both Forests.

Based on experiences from the 1996-2001 period, the forest units used in the newly (amalgamated) Lake Nipigon Forest 2001-06 FMP were further refined, as presented in Table 2c. For example, the sorting criteria in the previous plan did not differentiate between the pure or mixedwood conditions in the conifer-dominated (spruce and jack pine) stands, which often exist on the forest. With the increased importance of conifer-dominated mixedwoods in meeting habitat and ecological requirements, and the increased demand for hardwood from the Forest, the planning team decided to break out the mixedwood portion of these conifer forest units and track them separately in modeling and harvest allocations. The break point of 10% hardwood component or greater, was developed based on the observation (in previous FTG and stocking assessments) that once jack pine and spruce working groups have more than a 10% hardwood component, they generally develop along very different ecological pathways than pure stands.

In the 2001-06 FMP the poplar forest units were differentiated more on the concept of "purity" of the stand, rather than simply based on conifer content within poplar stands as was the case in the previous FMP. A 70% poplar content was required to meet the more pure criteria of the PoHD (deep) and PoHS (shallow) forest units, which were subsequently sorted by site class. The same "purity" concept was used with white birch, but with a 60% white birch threshold.

concern and efforts were taken to separate the rugged conifer-dominated PFR stands (CPFR) and the cedar and larch dominated lowland stands (OC). The rest of the forest units (Pj, Bf, Po and Bw) simply reflected the main working groups present on the both forests.

2006 Independent Forest Audit
Table 2a - Description of Forest Units for the 1991-1996 Period
MU: Lake Nipigon Forest

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Spruce 1	Spruce 1	Conifer	Spruce	V24,25,31,33,34,35,36,37,38,15, 19,20,30,31,32	clearcut	All black and white spruce stands, site class X and 1 in the spruce working group
Spruce 2	Spruce 2	Conifer	Spruce	V24,25,31,33,34,35,36,37,38,15, 19,20,30,31,32	clearcut	All black spruce stands with site class 2 and 3 with height more than 11 metres at age 80. All other conifer stands site class 2 or 3 with >60% stocking and black spruce component of 30% or more and height of 11 metres at age 80
Spruce 3	Spruce 3	Conifer	Spruce			All remaining site class 3 black spruce and other conifer
Sp	Spruce	Conifer	Spruce	V24,25,31,33,34,35,36,37,38,15, 19,20,30,31,32	clearcut	All spruce stands, site class X,1,2,3 in the spruce working group
CPFR	Conifer PFR	Conifer	Spruce, Jack Pine, Balsam Fir	V28,30,31,32,33	clearcut	All stands site class X,1,2,3 in the spruce, jack pine and balsam fir working groups classified as PFR
Oc	Other Conifer	Conifer	Larch, Cedar		clearcut	Larch or Cedar dominated lowland
Pj	Jack Pine	Conifer	Jack Pine	V17,18,28,29,30,32	clearcut	All jack pine stands, site class X,1,2,3 in the jack pine working group
Bf	Balsam Fir	Conifer	Balsam Fir	V14,16, 24,25,31	clearcut	All balsam fir stands, site class X,1,2,3 in the balsam fir working group
Po	Poplar	Intolerant Hardwood	Poplar	V1,4,5,6,7,8,9,10,11	clearcut	All stands site class X,1,2,3 in the poplar working group
Bw	White Birch	Intolerant Hardwood	White Birch		clearcut	All stands site class X,1,2,3 in white birch working group

Source: Section 4.8.3.1.1 of the Lake Nipigon Forest and Auden Forest 1991-1996 TMPs.
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The conifer PFR forest unit (CPFR) listed in Table 2a was dropped in 1996, in favour of individual PFR (Coded "5s") forest units which contained all of the PFR stands classified for each of the major working groups. It was felt that these individual PFR forest units more accurately reflected different rotation age, successional pathways and silvicultural treatments on these sites, rather than grouping them into a conifer PFR (spruce, jack pine and balsam fir) and leaving the rest of the PFR area with each of the other working groups. The rugged (Coded "4s") forest units were also created for each working group in order to identify entire stands or groups of stands growing on rugged terrain that were not likely to be operated.

The 1996-2001 forest units also reflected a different direction with the development of a set of hardwood forest units based upon the relative presence or absence of conifer in the poplar and birch working groups. The forest units reflect product requirements and management regimes over the range of conditions on the Forest. In recognition of the fact that virtually all of the softwood fibre is destined for sawmills initially, one of the primary considerations was the production of an optimum product for sawmills.

2006 Independent Forest Audit
Table 2b - Description of Forest Units for the 1996-2001 Period
MU: Lake Nipigon Forest

Forest Unit		Forest	Main	Site Type(s)	Silvicultural	FRI Parameters
Code	Name	Type	Working Group	(ES =NW ONT. Forested Ecosites)	System	& Criteria
Sp1	Spruce-Conifer	Conifer	Spruce	ES12, 20, 22, 25, 26, 31	clearcut	All upland spruce stands not classified as Sp4 or Sp5
Sp3	Spruce-Lowland	Conifer	Spruce	ES 34, 35, 36	clearcut	Spruce dominated with Domtar site type 1
Sp4	Spruce-Rugged	Conifer	Spruce			Spruce dominated with Domtar site type 6
Sp5	Spruce PFR	Conifer	Spruce			Spruce typed as PFR
Pj1	Jack Pine Conifer	Conifer	Jack Pine	ES13, 14, 20, 25, 26	clearcut	All jack pine stands not classified as Pj4 or Pj5
Pj4	Jack Pine-Rugged	Conifer	Jack Pine			Jack Pine dominated with Domtar site type 6
Pj5	Jack pine PFR	Conifer	Jack Pine			Jack pine stands typed as PFR
Pr1	Red Pine	Conifer	Red Pine			Stands with a red pine working group
Bf1	Balsam Fir	Conifer	Balsam Fir	ES21, 27, 32	clearcut	Balsam fir dominated stands not classified as Bf4 or Bf5
Bf4	Balsam Fir-Rugged	Conifer	Balsam Fir			Balsam fir dominated with Domtar site type 6
Bf5	Balsam Fir PFR	Conifer	Balsam Fir			Balsam Fir stands typed as PFR
Oc3	Other Conifer	Conifer	Larch, Cedar	ES17, 36, 37	clearcut	Larch or Cedar dominated lowland
Po1	Poplar Mixed wood	Intolerant Hardwood	Poplar	ES16, 19, 23, 28, 29, 33	clearcut	Poplar working group with component of > 25% spruce and/or jack pine and/or balsam fir
Po2	Poplar Pure	Intolerant Hardwood	Poplar	ES16, 19, 23, 28, 29, 33	clearcut	Poplar working group with component of < 25% spruce and/or jack pine and/or balsam fir
Po4	Poplar-Rugged	Intolerant Hardwood	Poplar			Poplar dominated with Domtar Site Type 6
Po5	Poplar PFR	Intolerant Hardwood	Poplar			Poplar stands typed as PFR
Bw1	White Birch-Mixedwood	Intolerant Hardwood	White Birch	ES16, 19, 23, 28, 29, 33	clearcut	Birch working group with component of > 25% spruce and/or jack pine and/or balsam fir
Bw2	White Birch - Pure	Intolerant Hardwood	White Birch	ES16, 19, 23, 28, 29, 33	clearcut	Birch working group with component of < 25% spruce and/or jack pine and/or balsam fir
Bw4	White Birch-Rugged	Intolerant Hardwood	White Birch			Birch dominated with Domtar Site Type 6
Bw5	White Birch PFR	Intolerant Hardwood	White Birch			Birch stands typed as PFR

Source: Section 4.8.3.1.1.1 of the Lake Nipigon Forest 1996-2001 FMP and the Auden Forest 1997-2002 FMP.
Forest units shaded in green are unique to the Lake Nipigon Forest.
Forest units with no shading are common to both Forests.

Based on experiences from the 1996-2001 period, the forest units used in the newly (amalgamated) Lake Nipigon Forest 2001-06 FMP were further refined, as presented in Table 2c. For example, the sorting criteria in the previous plan did not differentiate between the pure or mixedwood conditions in the conifer-dominated (spruce and jack pine) stands, which often exist on the forest. With the increased importance of conifer-dominated mixedwoods in meeting habitat and ecological requirements, and the increased demand for hardwood from the Forest, the planning team decided to break out the mixedwood portion of these conifer forest units and track them separately in modeling and harvest allocations. The break point of 10% hardwood component or greater, was developed based on the observation (in previous FTG and stocking assessments) that once jack pine and spruce working groups have more than a 10% hardwood component, they generally develop along very different ecological pathways than pure stands.

In the 2001-06 FMP the poplar forest units were differentiated more on the concept of "purity" of the stand, rather than simply based on conifer content within poplar stands as was the case in the previous FMP. A 70% poplar content was required to meet the more pure criteria of the PoHD (deep) and PoHS (shallow) forest units, which were subsequently sorted by site class. The same "purity" concept was used with white birch, but with a 60% white birch threshold.

The 2001-06 FMP planning team determined that the continued use of the "rugged" forest units was worthwhile, since they could be limited in SFMM modeling and reflect the reality that these stands typically cannot be harvested. A Red Pine forest unit was also introduced during this planning term, to recognize the presence of red pine plantations that were established in the 1950's and 1960's.

The forest units developed for the 2001-06 FMP were created to reflect the range of forest ecosystems present on the Lake Nipigon Forest. Based on the use of these forest units through the first part of the 2001-06 plan period, it was felt that they were ecologically sound with few changes required. Considerable effort had also been incorporated into the development of succession and yield curves for the 2001-06 FMP and it was felt that these curves effectively captured succession and yield trends on the Lake Nipigon Forest.

2006 Independent Forest Audit
Table 2c - Description of Forest Units for the 2001-2006 Period
MU: Lake Nipigon Forest

Forest Unit		Forest	Main	Site Type(s)	Silvicultural System	FRI Parameters and Criteria	Sort Order
Code	Name	Type	Working Group	(ES =NW ONT. Forested Ecosites)			
SpC	Spruce-Conifer	Conifer	Spruce	ES12, 20, 22, 25, 26, 31	clearcut	W.G. = (Sb or Sw) and (Sb+Sw+Ce+Bf+La) >= 0.7 and (Po+Bw) <= 0.2	6
SpM	Spruce-Mixedwood	Conifer Mixedwood	Spruce	ES12, 14, 20, 21, 27, 28	clearcut	W.G. = (Sb or Sw) and (Po+Bw) > 0.1	9
SpL	Spruce-Lowland	Conifer	Spruce	ES 34, 35, 36	clearcut	(Sb+Ce+La) >= 1 and Sb >= 0.6 and Site Class = (2, 3 or 4)	5
SpR	Spruce-Rugged	Conifer	Spruce			W.G. = (Sb or Sw) and Domtar Modifier = 6 (Rugged Site Type)	3
PjC	Jack Pine Conifer	Conifer	Jack Pine	ES13, 14, 20, 25, 26	clearcut	W.G. = Pj and (Pj+Pr) >= 0.7 and (Po+Bw) <= 0.2	8
PjM	Jack Pine-Mixedwood	Conifer Mixedwood	Jack Pine	ES14, 20, 26	clearcut	W.G. = Pj and (Po+Bw) > 0.1	10
PjR	Jack Pine-Rugged	Conifer	Jack Pine			W.G. = Pj and Domtar Modifier = 6 (Rugged Site Type)	7
BfM	Balsam Fir-Mixedwood	Conifer Mixedwood	Balsam Fir	ES21, 27, 32	clearcut	W.G. = Bf	12
BfR	Balsam Fir-Rugged	Conifer Mixedwood	Balsam Fir			W.G. = Bf and Domtar Modifier = 6 (Rugged Site Type)	11
OcL	Other Conifer-Lowland	Conifer	Larch, Cedar	ES17, 36, 37	N/A	(Ce+La) >= 0.5 or W.G. = Ce or W.G. = La	2
PoHD	Poplar-Hardwood-Deep	Intolerant Hardwood	Poplar	ES16, 19, 23, 28, 29, 33	clearcut	Po >= 0.7 and Site Class = (X, 1 or 2)	15
PoHS	Poplar-Hardwood-Shallow	Intolerant Hardwood	Poplar	ES16, 19, 23, 28, 29, 33	clearcut	Po >= 0.7 and Site Class = (3 or 4)	16
PoM	Poplar -Mixedwood	Poplar Mixedwood	Poplar	ES16, 19, 23, 28, 29, 33	clearcut	W.G. = Po	17
PoR	Poplar-Rugged	Intolerant Hardwood	Poplar		clearcut	W.G. = Po and Domtar Modifier = 6 (Rugged Site Type)	14
BwH	White Birch-Hardwood	Intolerant Hardwood	White Birch		clearcut	Bw >= 0.6	19
BwM	White Birch-Mixedwood	Birch Mixedwood	White Birch	ES16, 19, 23, 28, 29, 33	clearcut	W.G. = Bw	20
BwR	White Birch-Rugged	Intolerant Hardwood	White Birch			W.G. = Bw and Domtar Modifier = 6 (Rugged Site Type)	18
CPFR	Conifer PFR	Conifer	Conifer	ES12, 13, 14, 20, 21, 22, 25, 26, 27, 28, 31	clearcut	W.G. = (Sb, Sw, Pj, Bf, Ce or La) and MNR Stand Type "PFR" and Domtar Modifier = 6 (Rugged Site Type)	4
Pr	Red Pine	Conifer	Red Pine			W.G. = Pr	1
Oh	Other Hardwood	Hardwood				W.G. = (OH, MH or AB)	13

Source: Table FMP-8 of the Lake Nipigon Forest 2001-2006 FMP

The fundamental question in developing the 2006-11 FMP forest units was whether to continue using the set of 2001-06 FMP forest units (or some iteration thereof), or was it more appropriate to change to the Northwest Region MNR regional standard forest units. MNR indicated that there was no requirement to move to the regional standard forest units provided that the proposed 2006-11 FMP forest units utilized effectively represented ecological and management considerations on the Lake Nipigon Forest.

An analysis was undertaken of the correlation between the 2001 forest units and the regional standard forest units. The results of this analysis showed that there were forest units that could be adapted in order to more accurately reflect the definition of the regional standard. Ultimately, a number of changes were made to the 2001 FMP forest units as a result of the detailed review. A detailed description of the

analysis and subsequent development of the forest units used in the 2006-11 FMP can be found in Section 1.1.3, Part One of the Analysis Package, provided in Appendix AI of the plan.

2006 Independent Forest Audit
Table 2d - Description of Forest Units for the 2006-2011 Period
MU: Lake Nipigon Forest

Forest Unit		Forest	Main	Site Type(s)	Silvicultural System	FRI Parameters and Criteria	Sort Order
Code	Name	Type	Working Group	(ES =NW ONT. Forested Ecosites)			
BfM	Balsam Fir Mixedwood	Conifer	balsam fir	ES21	clearcut	Bf >= 4 Or (W.G. = Bf and Bf = 3)	4
BwH	Birch Hardwood	White Birch dominated	birch	ES19	clearcut	Bw >= 6	13
BwM	Birch Mixedwood	White Birch dominated mixedwood	white birch	ES19	clearcut	WG = Bw Or (vWG = "AB" Or "A")	14
CeUp	Upland Cedar	Conifer	cedar	ES17	clearcut	W.G. = Ce or Ce >20 and ES=17	9
OcL	Other Conifer Lowland	Conifer	larch, cedar	ES36,37	clearcut	((W.G. = Ce or W.G. = La or (Ce+La) >= 0.5) And vMOD = 1) or ((Sb + Ce + La) = 10 and (Ce+ La) >= 5)	2
PjC	Jack Pine Conifer	Conifer	jack pine	ES13,20	clearcut	(Sb+Sw+Bf+ Pj+Ce+ La >= 5) and (Po+Bw+Pb+Mh+Uh+ Lh < 2) and (Pj >= (Sb+Sw)	5
PjM	Jack Pine Mixedwood	Conifer	jack pine	ES14,20,21	clearcut	(Sb+Sw+Bf+ Pj+Ce+ La >= 5) and (Pj >= (Sb+Sw) and (Po+Bw+Pb+Mh+Uh+ Lh >= 2) Or (W.G. = "Pj") and (Po+Bw+Pb+Mh+Uh+ Lh >= 2)	7
PoHP	Poplar Hardwood Poor	Intolerant Hardwood	poplar	ES19	clearcut	(Po+Pb >= 7) and (SC = 3 or 4)	11
PoHR	Poplar Hardwood Rich	Intolerant Hardwood	poplar	ES16,19	clearcut	(Po+Pb >= 7) and (SC = X, 1 or 2)	10
PoM	Poplar Mixedwood	Poplar dominated mixedwood	poplar	ES16,19	clearcut	(W.G. = "Po" or "Pb") Or (Po+Pb >= Bw and (vWG = "AB" Or vWG = "A"))	12
PrwM	Red and White Pine Mixedwood	Conifer Mixedwood	pine	ES13,15,21	clearcut	Pw or Pr => 4	1
SpC	Spruce Conifer	Conifer	spruce	ES12,14,20,21,22,26	clearcut	(Sb+Sw+Bf+ Pj+Ce+ La >= 5) and (Po+Bw+Pb+Mh+Uh+ Lh < 2) and ((Sb+Sw) > Pj)	6
SpL	Lowland Spruce	Conifer	spruce	ES34,35,36,37	clearcut	((Sb+La+Ce) = 10 and Sb >= 6 and vMOD = 1) or (vMOD = 0 and ES = (34, 35, 36, 37 or 38))	3
SpM	Spruce Mixedwood	Conifer Mixedwood	spruce	ES14,20,21,26	clearcut	(Sb+Sw+Bf+ Pj+Ce+ La >= 5) and ((Sb+Sw) > Pj) and (Po+Bw+Pb+Mh+Uh+ Lh >= 2) Or ((W.G. = "S", "Sb", "Sw" or "Ce") and (Po+Bw+Pb+Mh+Uh+ Lh >= 2))	8

Source: Table FMP-8 of the Lake Nipigon Forest 2006-2011 FMP

2.3 Summary of Planned and Actual Harvest Volumes

Trend Analysis Table 3 and chart (Figure 1) shows a summary of the annual planned and actual harvest volumes during the 1991-2006 period on the Lake Nipigon Forest. In preparing this table for the past planning periods (1991-96 and 1996-2001), the planned and actual volumes for the two separate forests (pre-amalgamation) were summarized, then annualized, then added together. As mentioned in the introduction to this report, the timeframes for the former Auden Forest were actually 1991-97 and 1997-2001.

The actual volume utilization during the 1991-96 planning period was 53% of the planned level. Only 32% of the planned hardwood volume was utilized, whereas 60% of the planned softwood volume was utilized. This shortfall was primarily the result of the closure of Domtar's woodlands operations in the spring of 1992, necessitated by the shut-down of Domtar's newsprint machine at the Red Rock mill.

The shortfall in poplar utilization was the result of Domtar not proceeding with the conversion to "white top" linerboard as originally planned, and the uncertainty associated with MNR's commitments to other mills for the hardwood fibre on the Lake Nipigon Forest. Another factor contributing to the shortfall was that although volumes were reported for a 6-year term for the former Auden Unit, virtually no activity took place during the first two years of the plan.

The total volume actually utilized during the 1996-2001 FMP period was approximately 68% of the planned utilization, when including the summaries of both pre-amalgamated Forests. The actual softwood utilization was 79% of planned, whereas the actual hardwood utilization was only 44% of planned for the 1996-2001 period. The achievement on the former Auden Forest (78%) was noticeably better than on the former Lake Nipigon Forest (64%). The conifer volume shortfalls on both management units were consistent with slightly lower than planned harvest areas.

2006 Independent Forest Audit
Table 3 - Summary of Planned & Actual Harvest Volumes
MU: Lake Nipigon Forest

Planned Harvest Volumes (Annualized)

Species		*Volume in cubic metres*			
		Past Plans		Current	
		1991-1996 [1]	1996-2001 [2]	2001-2006 [3] Regular	2001-2006 [4] Salvage
	S	436,823	366,654	349,634	84,921
	Pj	59,236	95,513	142,887	6,829
	B	63,837	37,131	28,149	8,079
	Ce & L	2,622	0	0	0
	Po	142,570	144,665	137,673	32,408
	Bw	21,518	74,793	51,148	13,764
		0	0	0	0
Total Planned Volumes		726,607	718,756	709,491	146,001

Actual Harvest Volumes (Annualized)

Species		*Volume in cubic metres*			
		Past Plans		Current	
		1991-1996 [1]	1996-2001 [2]	2001-2006 [3] Regular	2001-2006 [4] Salvage
	S	203,389	291,885	255,998	118,951
	Pj	89,270	91,586	45,141	8,134
	B	42,073	11,554	6,689	11,013
	Ce	142	0	540	16
	La	0	178	644	143
	Oc	22	178	0	0
	Pw	0	12	4	0
	Pr		67		309
	Po	52,664	91,933	105,878	15,428
	Bw	445	4,009	4,997	0
	OH	186	0	3	0
Total Actual Volumes		388,190	491,403	419,894	153,992

1. Source: Table RPFO-4 - for the Lake Nipigon Forest (for the 5-year period from 1991-1996), contained in the Report of Past Forest Operations for the Lake Nipigon Forest for the 2001-2006 FMP.

2. Source: Table RPFO-4 - for the Lake Nipigon Forest (for the 5-year period from 1996-2001), contained in the Report of Past Forest Operations for the Lake Nipigon Forest for the 2006-2011 FMP.

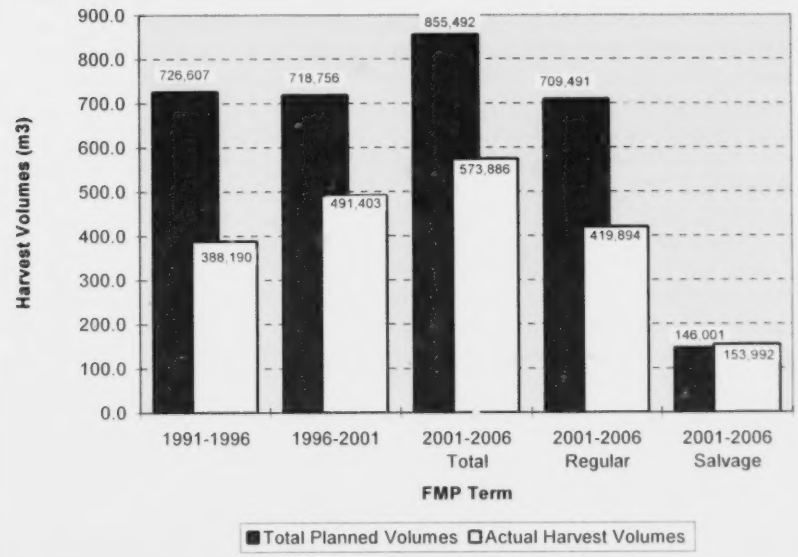
3. Source: Planned values from Table 21 - Lake Nipigon Forest 2001-06 FMP. Actual values from Table AR-4 in the 2004-05 Annual Report.

4. Source: Actual values from Table FMP-23a plus Amendments #'s 21, 22 23, 25 & 28. Actual values are from Table AR-4 in the 2004-05 Annual Report.

Note: Volumes are currently not available for the final year 2005-06.

The underutilization of hardwood volumes during the 1996-2001 period can be generally attributed to the logistics associated with the SFL Appendix E commitments (distance to markets for the flaker, sawlog and pulp grade poplar), the overall poorer quality of the poplar from the Lake Nipigon Forest, and the strength of traditional sources of poplar for these mills. Additionally, there was no market for white birch. Another contributing factor includes Block 661 in the former Lake Nipigon Forest (primarily poplar), remaining inaccessible due to MNR's decision to not allow a crossing of Cypress Creek to access the block.

Figure 1. Planned vs Actual Harvest Volumes (Annualized)



During the first four years of the 2001-06 FMP, the total annualized volumes utilized (573,886 m^3) equate to approximately 67% of the planned volumes (855,492 m^3), as portrayed in the bar graph above. The total volume bars include salvage plus regular harvest volumes. Due to the sizable amount of timber recovered by salvage harvest efforts, the regular and salvage bars have been inserted separately for illustration purposes. The seemingly disproportionate overachievement in salvage harvest volume is due to salvage rates being approved and credited to planned regular volumes (within regular harvest areas).

A number of contributing factors have influenced the lower than planned volumes, from time to time over the past four year period from 2001 to 2005, including:

- Not all timber (harvested in 2005-06) has been delivered to receiving mills (and therefore has not been included in the annual report summary);
- Limited hardwood markets (resulting in uncut timber);
- The emphasis placed on salvage harvest operations;
- Overlapping licensees had difficulty in maintaining contractors due to increased fuel and insurance costs, particularly evident in blocks located at the northern extent of the forest;
- Late start-ups for some overlapping licensees;
- The original forest cover in some of the planned salvage areas (Nipigon 12 wildfire) consisted of very poorly stocked second growth mixedwood stands with a history of budworm damage, and were not harvested due to their low volume and poor wood quality.
- The original forest cover in some of the planned salvage areas (Nipigon 58 wildfire) were in old cutovers consisting of very young second growth stands, and were not harvested due to their low volume and poor wood quality;
- The time lapse between when the fire (Nipigon 12) had occurred and the time of salvage harvest had caused additional volume to be lost;
- Salvage efforts on the blowdown/snow damaged areas (Amendment #'s 22, 23 & 25) have been focused on upland areas, leaving lowland forest units unharvested to date.
- Relatively warm winters, with a late freeze up and early thaw, have resulted in lower than planned harvest levels of the lowland conifer forest units (harvest activities in some Nipigon 12 Wildfire areas had to cease early to ensure that timber could be delivered prior to spring break up).

When discussing planned versus actual volumes, it is appropriate to review planned versus actual yields (m^3/ha). For example, a comparison can be made by reviewing the actual volumes utilized from the corresponding harvest areas over the 1996-2001 term (as reported in Tables RPFO-4 and RPFO-1 respectively, for the former Lake Nipigon Forest). An average yield (for all species and forest units combined) of 133.4 m^3/ha was forecasted, with an actual yield achievement of 96.4 m^3/ha being realized. This lower than forecasted yield was contributed to by several factors including: the planning inventory was outdated (based on the 21 year old 1975 FRI), the relative harvest levels in the mixedwood forest units (i.e. conifer being targeted within mixedwood stands while bypassing individual and patches of hardwood trees), and poor hardwood utilization due to poor market conditions and developing poplar product specification. The harvest activity in hardwood stands to utilize the conifer component, although occurring less frequently in the latter years of the 1996-2001 planning period, was identified as a compliance concern during the 2001-2006 term.

On the other hand, over the 1997-2001 FMP period on the former Auden Forest, an actual average yield of 96.0 m^3/ha was achieved, compared to a planned yield of 92.0 m^3/ha. This slightly higher than forecast yield can be attributed to the relative harvest levels in the various forest units (i.e. a higher proportion of the conifer forest units were actually harvested than hardwood forest units).

The 2001-06 FMP planning team was fairly comfortable with using the yield curves provided by the MNR, that were available for use for strategic modeling purposes (SFMM), as a starting point. The Northeast Region curves, developed from an extrapolation of field data obtained from Northeast Region Science and Technology Unit, were used to generate the "present" yield curves. These yield curves formed the base set of curves from which adjustments were made. Staff from Domtar, MNR Nipigon District and the MNR Northwestern Ontario Science and Technology Development Unit participated in the final adjustments and further development of the yield curves. The yield curves, for each forest unit and intensity, used in SFMM modeling exercises can be found in Appendix J - Section 6 of the 2001-06 FMP. Specific information on the development of the yield curves can be found in Section 2.3.5.1.10a of the 2001-06 FMP.

The 2001-06 FMP was the first FMP on the Lake Nipigon Forest where SFMM was used, but Domtar, having gained some valuable experience in preparing the 2000-05 Armstrong Forest FMP, felt that the Northeast Region curves best represented the conditions found on the Lake Nipigon Forest. Furthermore, Domtar was somewhat familiar with the Northeast Region curves, having used them in some SFMM modeling supplemental work for the 1996-2001 FMP (in comparative exercises with the MADCALC Forest Regulation Model).

The Forest Modeling Task Team, in preparing the 2006-11 FMP, undertook comparisons of different yield curve sets generated through SFMMTool 3.0, with each of the Northwest, Northeast and Maurer's curves. The "Maurer" curves were ultimately selected for SFMM modeling purposes to project how the forest would develop through time. These curves had their start based on modifications to Plonski (1960) Normal Yield Table data, but included a more realistic representation of mortality, and net merchantable volumes after rotation age is reached. The work of Neil Maurer, in developing the Northeast Regional Average curve set used in 2001-06 FMP, incorporated all of the above noted information as well. The Maurer curves used in the 2006 FMP however, also incorporated empirical modifications to the curves based on field data obtained through cruising. A detailed description of yield curve development has been provided in Section 2.1.1 of Appendix AI, Part 2, of the 2006-11 FMP.

2.4 Summary of Planned and Actual Harvest Area

Trend Analysis Table 4 and the accompanying bar graph provide a summary of the planned and actual annual average harvest areas during the 1991-2006 period on the Lake Nipigon Forest. As mentioned in the introduction to this report, it has been necessary to report these areas on an annualized basis, to account for the amalgamation of two management units prepared under different planning cycles (for past planning periods), and because 5-year data is not yet available for the current term.

For compatibility and simplicity purposes, forest units have been aggregated by their main working groups in Table 4, rather than reporting every forest unit that was used for each FMP term. This is due to the

number of changes, the complexity and shear numbers of different forest units used over three planning periods, as described previously in the text associated with Table 2.

2006 Independent Forest Audit

Table 4 - Summary of Planned and Actual Depletion Area (Annualized)

MU: Lake Nipigon Forest

	Planned Annual Depletion Area (Area in hectares)				Actual Annual Depletion Area (Area in hectares)						
	Past Plans		Current		Past Plans				Current		
Plan Term	1991-1996 [1]	1996-2001 [2]	2001-2006 [3] Regular	2001-2006 [4] Salvage	1991-1996 [5]		1996-2001 [6]		2001-2006		
Forest Unit					Harvest	Natural	Harvest	Natural	Regular [7]	Salvage [8]	Natural [9]
Spruce	3,339	3,524	4,963	1,588	1,841	114	3,440	689	4,219	835	126
Jack Pine	718	517	107	61	601		507	7	136	53	37
Red Pine				9				1		5	
Balsam Fir	899	74	81	44	234		148	374	93	37	6
Conifer PFR	154		258	26	129				283	10	
Other Conifer	45		46	33	4		2	34	15	8	
Poplar	1,132	1,163	1,067	683	484	21	642	727	1,173	324	2
White Birch	223	327	294	74	109		230	96	214	23	
B&S					24		30	31			
PF							15				
Other									47	10	4
Total Area	6,510	5,606	6,816	2,519	3,426	135	5,013	1,959	6,179	1,306	175

1. Source: Table 4.16 for the Lake Nipigon Forest 1991-96 TMP and Table RPFO-1B for the Auden Forest (for the 1991-1997 period).
2. Source: Tables 4.16 for the Lake Nipigon Forest 1996-2001 TMP and for the Auden Forest 1997-2001 TMP.
3. Source: Table FMP-18 Lake Nipigon Forest 2001-2006 FMP
4. Source: Table FMP-22a plus Amendments #'s 21, 22 23, 25 & 28
5. Source: Tables RPFO-1A and RPFO-1B for the Lake Nipigon Forest (for a 5-year period from 1991-1996), contained in the Report of Past Forest Operations for the Lake Nipigon Forest for the 2001-2006 FMP.
6. Source: Table RPFO-1 for the Lake Nipigon Forest (for a 5-year period from 1996-2001), contained in the Report of Past Forest Operations for the Lake Nipigon Forest for the 2006-2011 FMP.
7. Source: Table AR-1 ("Actual to Date" column), 2004-05 Annual Report for the Lake Nipigon Forest.
8. Source: Tables AR-1 ("Salvage" column), 2004-05 Annual Report for the Lake Nipigon Forest.
9. Source: Table AR-6 ("Total to Date" row), 2004-05 Annual Report for the Lake Nipigon Forest.

Note: Individual forest units were rolled up into broader WGs to fit the format of this table.

The actual harvest area for the 1991-96 period amounted to 53% of the planned harvest area. As discussed previously with Table 3, this shortfall was primarily the result of the closure of Domtar's woodlands operations in 1992 and relative inactivity on the former Auden Unit early in the term. Small 3rd party harvesting operations continued on the Forest through the middle of the planning period. Depletion levels increased towards the end of the planning term when a third party agreement was signed with Buchanan Forest Products Ltd. as part of a fibre exchange agreement between Domtar and Great West Timber. The depletion level in the spruce forest unit, which is the dominant softwood forest unit, was 55%. Balsam fir depletion levels were only 26%, due to the severe spruce budworm damage experienced in allocated balsam fir stands during this planning period. Depletion levels in the jack pine and conifer PFR forest units both achieved 84%.

Depletion levels within the hardwood forest units were also low (44%) during the 1991-96 planning period. The shortfall in poplar depletion was primarily the result of Domtar not proceeding with the conversion to "white top" linerboard as originally planned. Another contributing factor to the lower than planned depletion levels in hardwood was the uncertainty associated with MNR's commitments to other mills for the hardwood fibre from the Lake Nipigon Forest.

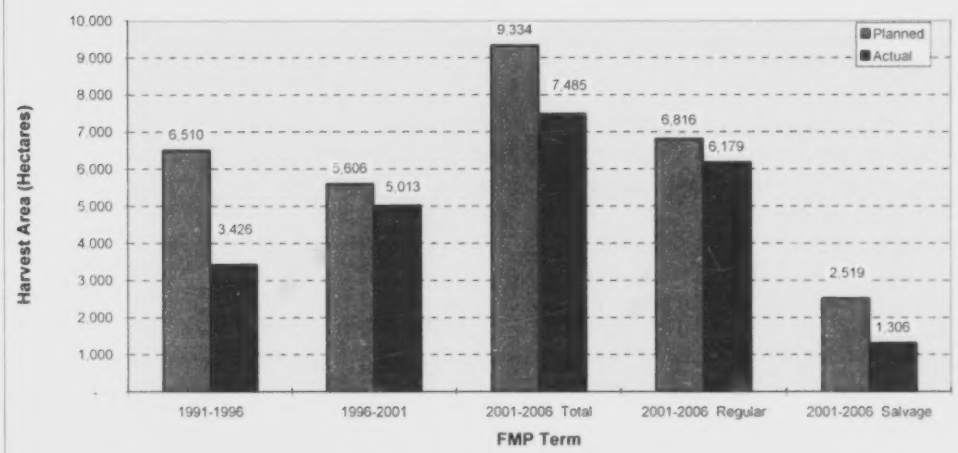
The level of achievement was much higher during the 1996-2001 FMP period, with actual harvest area attaining 89% of the planned harvest area (100% in conifer-dominated forest units, and 58% in hardwood-dominated forest units). Any unharvested areas within individual conifer-dominated forest units can generally be attributed to bypass (unmerchantible or inoperable areas). There were also some lowland spruce stands in the former Auden unit that were not harvested due to poor market conditions in 2000-01.

The more significant shortfall of harvest levels in hardwood-dominated stands during the 1996-2001 period was a direct result of the reasons discussed previously, associated with Table 3, including:

- Logistics associated with the SFL Appendix E commitments (dependent mills had less expensive alternative sources of poplar fibre during this timeframe);
- Distance to market for chipper quality poplar;
- Relatively poor quality poplar on the former Lake Nipigon Forest;
- Accessibility issues relating to several blocks, due to road construction costs, delays or other restrictions (e.g. MNR's decision not to cross Cypress Creek);
- Time required to bring Buchanan Northern Hardwood Ltd. Mill up to capacity;
- Lack of markets for white birch.

Progressing into the 2001-06 FMP term, based on four years of reportable data, the total (annualized) areas harvested equate to an approximate 80% level of achievement compared to planned depletions, as portrayed in Figure 2. The "2001-06 Total" bars reflect the salvage plus regular harvest areas. The refocusing of efforts towards additional salvage areas has most significantly influenced planned forestry activities. Due to the sizable amount of timber recovered by salvage harvest efforts, the regular and salvage bars have been inserted separately for illustration purposes. The difference between planned salvage and actual salvage harvest area is primarily the result of the difficulties encountered in operating the areas damaged by the 2001 snow/wind storms. Poor harvesting conditions within these blocks, as well as difficult access made some areas uneconomical to operate and were therefore not harvested.

Figure 2. Planned vs Actual Harvest Area
(All Forest Units Total)



In addition to the salvage harvest areas identified during plan preparation (in Table FMP-22a) to recover timber losses in the Nipigon 12 wildfire, as mentioned earlier, there have been several amendments related to the Nipigon 58 Wildfire and the 2001 snow/wind storm. The resulting total planned salvage area is 12,593 hectares (annualized in Table 4 to 2,519 hectares). As there has been no corresponding reduction in planned regular harvest area (appropriately), the difference between planned and actual achievement is expected and reasonable.

2.5 Summary of Managed Productive Forest By Forest Unit

Trend Analysis Tables 5a-d, covering the 15-year period from 1991 to 2006, provide a summary of Crown Managed productive forest, by forest unit and age class. Since area summaries are readily available for the 2006-11 FMP, they have also been presented in this report. Productive forest is composed of Protection Forest (PF) and Production Forest. Productive forest also includes Barren and Scattered or

NSR (Not Sufficiently Regenerated) land. The sources of information for these areas are Tables TMP-4.8.2 and TMP-4.9 for the 1991-96 and 1996-2001 periods, and Table FMP-9 for the 2001-06 and 2006-11 FMP periods.

The "Unavailable" Crown Managed Production Forest in Table 5 is where the areas reserved from harvest are normally summarized. These are areas of concern that have been identified to protect known and identified (existing) values such as moose aquatic feeding areas, water quality, tourism lakes, etc. In strategic modeling (SFMM), there are two types of reserves, "existing" and "accumulating". Up until and including the preparation of the 2001-06 FMP (the first plan where SFMM was used), most Areas of Concern (AOC) reserves that were prescribed in previous management plans (existing reserves) did not reside in the planning inventory. Caribou calving reserves that were known, existing reserves during the preparation of the 2001-06 FMP, were the only exception and have been recorded as "Unavailable" in Table 5c. Similarly, the associated volumes were not summarized during the previous planning periods covered by these tables and therefore cannot be provided until the 2001-06 FMP timeframe (in Table 5c).

2006 Independent Forest Audit
Table 5a - Summary of Managed Productive Forest By Forest Unit (1991-1996)
MU: Lake Nipigon Forest and Auden Forest

Forest Unit	Age Class	Protection Forest		Production Forest			
				Unavailable		Available	
		(ha)	(m3)	(ha)	(m3)	(ha)	(m3)
Spruce	B&S / NSR 2-6					47,811	
	FTG- 20					20,254	
	21 - 40					4,235	
	41 - 60					21,510	
	61 - 80					10,360	
	81 -100					16,019	
	101-120					27,279	
	121+					80,000	
Forest Unit Subtotal		14,787	N/A	N/A	N/A	227,468	N/A
Sb	B&S / NSR 2-6					23,882	
	FTG- 20					162	
	21 - 40					8,298	
	41 - 60					27,002	
	61 - 80					27,457	
	81 -100					36,456	
	101-120					29,691	
	121+					27,937	
Forest Unit Subtotal		7,817	N/A	N/A	N/A	180,885	N/A
Sw	B&S / NSR 2-6					37	
	FTG- 20					345	
	21 - 40					0	
	41 - 60					0	
	61 - 80					27	
	81 -100					135	
	101-120					43	
	121+					0	
Forest Unit Subtotal		0	N/A	N/A	N/A	587	N/A
Pine	B&S / NSR 2-6					4,586	
	FTG- 20					12,508	
	21 - 40					4,242	
	41 - 60					14,772	
	61 - 80					10,067	
	81 -100					1,359	
	101-120					1,003	
	121+					1,137	
Forest Unit Subtotal		774	N/A	N/A	N/A	49,674	N/A
Balsam Fir	B&S / NSR 2-6					6,227	
	FTG- 20					8,629	
	21 - 40					11,588	
	41 - 60					44,734	
	61 - 80					9,800	
	81 -100					4,367	
	101-120					591	
	121+					1,526	
Forest Unit Subtotal		104	N/A	N/A	N/A	87,462	N/A
Conifer (PFR)	B&S / NSR 2-6					3,013	
	FTG- 20					0	
	21 - 40					291	
	41 - 60					5,488	
	61 - 80					3,003	
	81 -100					3,392	
	101-120					6,949	
	121+					14,195	
Forest Unit Subtotal		0	N/A	N/A	N/A	36,331	N/A

Other Conifer	B&S / NSR 2-6					266	
	FTG- 20					0	
	21 - 40					94	
	41 - 60					175	
	61 - 80					78	
	81 -100					336	
	101-120					662	
	121+					3,178	
Forest Unit Subtotal		4,199	N/A	N/A	N/A	4,789	N/A
Poplar	B&S / NSR 2-6					12,864	
	FTG- 20					5,340	
	21 - 40					7,349	
	41 - 60					13,782	
	61 - 80					14,251	
	81 -100					10,946	
	101-120					15,266	
	121+					10,970	
Forest Unit Subtotal		1,878	N/A	N/A	N/A	90,768	N/A
Birch	B&S / NSR 2-6					2,140	
	FTG- 20					2,798	
	21 - 40					5,295	
	41 - 60					8,146	
	61 - 80					5,638	
	81 -100					4,778	
	101-120					10,970	
	121+					10,078	
Forest Unit Subtotal		1,705	N/A	N/A	N/A	49,843	N/A
Other Hardwood	B&S / NSR 2-6					0	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					0	
	61 - 80					4	
	81 -100					0	
	101-120					0	
	121+					0	
Forest Unit Subtotal		16	N/A	N/A	N/A	4	N/A
	TOTAL	31,280	N/A	N/A	N/A	727,811	N/A

Source: Tables 4.8.2 and 4.9 from the Lake Nipigon Forest and Auden Forest 1991 - 1996 TMPs.
Note: Volumes by age class and forest unit are not available for this planning period.

2006 Independent Forest Audit
Table 5b - Summary of Managed Productive Forest By Forest Unit (1996-2001)
MU: Lake Nipigon Forest and Auden Forest

Forest Unit	Age Class	Protection Forest		Production Forest			
		(ha)	(m3)	Unavailable		Available	
				(ha)	(m3)	(ha)	(m3)
Spruce 1	B&S / NSR 2-6					22,067	
	FTG- 20					6,702	
	21 - 40					24,233	
	41 - 60					46,745	
	61 - 80					46,869	
	81 -100					36,262	
	101-120					42,020	
	121+					63,600	
Forest Unit Subtotal		864	N/A	N/A	N/A	288,498	N/A
Spruce 3	B&S / NSR 2-6					15,762	
	FTG- 20					4,041	
	21 - 40					13,514	
	41 - 60					2,886	
	61 - 80					3,956	
	81 -100					9,210	
	101-120					15,965	
	121+					62,395	
Forest Unit Subtotal		20,571	N/A	N/A	N/A	127,729	N/A
Spruce 4	B&S / NSR 2-6					172	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					806	
	61 - 80					1,475	
	81 -100					2,490	
	101-120					3,201	
	121+					8,840	
Forest Unit Subtotal		1,285	N/A	N/A	N/A	16,984	N/A
Spruce 5 (PFR)	B&S / NSR 2-6					1,105	
	FTG- 20					600	
	21 - 40					1,834	
	41 - 60					3,204	
	61 - 80					3,879	
	81 -100					2,955	
	101-120					5,334	
	121+					10,363	
Forest Unit Subtotal		0	N/A	N/A	N/A	29,274	N/A
Jack Pine 1	B&S / NSR 2-6					6,471	
	FTG- 20					7,925	
	21 - 40					7,683	
	41 - 60					8,236	
	61 - 80					15,504	
	81 -100					1,837	
	101-120					1,494	
	121+					1,423	
Forest Unit Subtotal		544	N/A	N/A	N/A	50,573	N/A
Jack Pine 4	B&S / NSR 2-6					14	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					117	
	61 - 80					0	
	81 -100					0	
	101-120					18	
	121+					38	
Forest Unit Subtotal		288	N/A	N/A	N/A	187	N/A

Jack Pine 5 (PFR)	B&S / NSR 2-6					1,179	
	FTG- 20					211	
	21 - 40					809	
	41 - 60					1,364	
	61 - 80					1,292	
	81 -100					91	
	101-120					200	
	121+					116	
Forest Unit Subtotal		0	N/A	N/A	N/A	5,262	N/A
Balsam Fir 1	B&S / NSR 2-6					150	
	FTG- 20					478	
	21 - 40					2,054	
	41 - 60					9,066	
	61 - 80					3,434	
	81 -100					1,690	
	101-120					527	
	121+					195	
Forest Unit Subtotal		79	N/A	N/A	N/A	17,594	N/A
Balsam Fir 4	B&S / NSR 2-6					8	
	FTG- 20					0	
	21 - 40					8	
	41 - 60					1,420	
	61 - 80					948	
	81 -100					332	
	101-120					49	
	121+					151	
Forest Unit Subtotal		31	N/A	N/A	N/A	2,916	N/A
Balsam Fir 5 (PFR)	B&S / NSR 2-6					76	
	FTG- 20					30	
	21 - 40					91	
	41 - 60					152	
	61 - 80					237	
	81 -100					36	
	101-120					8	
	121+					29	
Forest Unit Subtotal		0	N/A	N/A	N/A	659	N/A
Red Pine 1	B&S / NSR 2-6					0	
	FTG- 20					0	
	21 - 40					9	
	41 - 60					96	
	61 - 80					0	
	81 -100					0	
	101-120					5	
	121+					0	
Forest Unit Subtotal		0	N/A	N/A	N/A	110	N/A
Other Conifer 1	B&S / NSR 2-6					103	
	FTG- 20					0	
	21 - 40					11	
	41 - 60					50	
	61 - 80					41	
	81 -100					176	
	101-120					706	
	121+					4,087	
Forest Unit Subtotal		4,204	N/A	N/A	N/A	5,174	N/A
Other Conifer 4	B&S / NSR 2-6					0	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					0	
	61 - 80					0	
	81 -100					0	
	101-120					0	
	121+					63	
Forest Unit Subtotal		0	N/A	N/A	N/A	63	N/A
Poplar 1	B&S / NSR 2-6					7,181	
	FTG- 20					5,005	
	21 - 40					14,782	
	41 - 60					8,605	
	61 - 80					9,642	
	81 -100					7,879	
	101-120					12,366	
	121+					6,837	

2006 Independent Forest Audit
Table 5b - Summary of Managed Productive Forest By Forest Unit (1996-2001)
MU: Lake Nipigon Forest and Auden Forest

Forest Unit	Age Class	Protection Forest		Production Forest			
		(ha)	(m3)	Unavailable		Available	
				(ha)	(m3)	(ha)	(m3)
Spruce 1	B&S / NSR 2-6					22,067	
	FTG- 20					6,702	
	21 - 40					24,233	
	41 - 60					46,745	
	61 - 80					46,869	
	81 -100					36,262	
	101-120					42,020	
	121+					63,600	
Forest Unit Subtotal		864	N/A	N/A	N/A	288,498	N/A
Spruce 3	B&S / NSR 2-6					15,762	
	FTG- 20					4,041	
	21 - 40					13,514	
	41 - 60					2,886	
	61 - 80					3,956	
	81 -100					9,210	
	101-120					15,965	
	121+					62,395	
Forest Unit Subtotal		20,571	N/A	N/A	N/A	127,729	N/A
Spruce 4	B&S / NSR 2-6					172	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					806	
	61 - 80					1,475	
	81 -100					2,490	
	101-120					3,201	
	121+					8,840	
Forest Unit Subtotal		1,285	N/A	N/A	N/A	16,984	N/A
Spruce 5 (PFR)	B&S / NSR 2-6					1,105	
	FTG- 20					600	
	21 - 40					1,834	
	41 - 60					3,204	
	61 - 80					3,879	
	81 -100					2,955	
	101-120					5,334	
	121+					10,363	
Forest Unit Subtotal		0	N/A	N/A	N/A	29,274	N/A
Jack Pine 1	B&S / NSR 2-6					6,471	
	FTG- 20					7,925	
	21 - 40					7,683	
	41 - 60					8,236	
	61 - 80					15,504	
	81 -100					1,837	
	101-120					1,494	
	121+					1,423	
Forest Unit Subtotal		544	N/A	N/A	N/A	50,573	N/A
Jack Pine 4	B&S / NSR 2-6					14	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					117	
	61 - 80					0	
	81 -100					0	
	101-120					18	
	121+					38	
Forest Unit Subtotal		288	N/A	N/A	N/A	187	N/A

Jack Pine 5 (PFR)	B&S / NSR 2-6					1,179	
	FTG- 20					211	
	21 - 40					809	
	41 - 60					1,364	
	61 - 80					1,292	
	81 -100					91	
	101-120					200	
	121+					116	
Forest Unit Subtotal		0	N/A	N/A	N/A	5,262	N/A
Balsam Fir 1	B&S / NSR 2-6					150	
	FTG- 20					478	
	21 - 40					2,054	
	41 - 60					9,066	
	61 - 80					3,434	
	81 -100					1,690	
	101-120					527	
	121+					195	
Forest Unit Subtotal		79	N/A	N/A	N/A	17,594	N/A
Balsam Fir 4	B&S / NSR 2-6					8	
	FTG- 20					0	
	21 - 40					8	
	41 - 60					1,420	
	61 - 80					948	
	81 -100					332	
	101-120					49	
	121+					151	
Forest Unit Subtotal		31	N/A	N/A	N/A	2,916	N/A
Balsam Fir 5 (PFR)	B&S / NSR 2-6					76	
	FTG- 20					30	
	21 - 40					91	
	41 - 60					152	
	61 - 80					237	
	81 -100					36	
	101-120					8	
	121+					29	
Forest Unit Subtotal		0	N/A	N/A	N/A	659	N/A
Red Pine 1	B&S / NSR 2-6					0	
	FTG- 20					0	
	21 - 40					9	
	41 - 60					96	
	61 - 80					0	
	81 -100					0	
	101-120					5	
	121+					0	
Forest Unit Subtotal		0	N/A	N/A	N/A	110	N/A
Other Conifer 1	B&S / NSR 2-6					103	
	FTG- 20					0	
	21 - 40					11	
	41 - 60					50	
	61 - 80					41	
	81 -100					176	
	101-120					706	
	121+					4,087	
Forest Unit Subtotal		4,204	N/A	N/A	N/A	5,174	N/A
Other Conifer 4	B&S / NSR 2-6					0	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					0	
	61 - 80					0	
	81 -100					0	
	101-120					0	
	121+					63	
Forest Unit Subtotal		0	N/A	N/A	N/A	63	N/A
Poplar 1	B&S / NSR 2-6					7,181	
	FTG- 20					5,005	
	21 - 40					14,782	
	41 - 60					8,605	
	61 - 80					9,642	
	81 -100					7,879	
	101-120					12,366	
	121+					6,837	

Poplar 2	B&S / NSR 2-6					6,704	
	FTG- 20					2,188	
	21 - 40					5,034	
	41 - 60					5,875	
	61 - 80					8,977	
	81 -100					4,321	
	101-120					5,739	
	121+					6,090	
	Forest Unit Subtotal	827	N/A	N/A	N/A	44,928	N/A
Poplar 4	B&S / NSR 2-6					19	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					162	
	61 - 80					25	
	81 -100					154	
	101-120					719	
	121+					413	
	Forest Unit Subtotal	157	N/A	N/A	N/A	1,492	N/A
Poplar 5	B&S / NSR 2-6					0	
	FTG- 20					0	
	21 - 40					74	
	41 - 60					175	
	61 - 80					611	
	81 -100					187	
	101-120					458	
	121+					318	
	Forest Unit Subtotal	0	N/A	N/A	N/A	1,823	N/A
Birch 1	B&S / NSR 2-6					2,618	
	FTG- 20					2,652	
	21 - 40					8,303	
	41 - 60					8,724	
	61 - 80					4,726	
	81 -100					3,519	
	101-120					8,131	
	121+					7,519	
	Forest Unit Subtotal	843	N/A	N/A	N/A	46,192	N/A
Birch 2	B&S / NSR 2-6					1,047	
	FTG- 20					405	
	21 - 40					1,589	
	41 - 60					2,228	
	61 - 80					2,566	
	81 -100					1,084	
	101-120					1,665	
	121+					730	
	Forest Unit Subtotal	144	N/A	N/A	N/A	11,314	N/A
Birch 4	B&S / NSR 2-6					9	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					62	
	61 - 80					207	
	81 -100					338	
	101-120					679	
	121+					2,342	
	Forest Unit Subtotal	722	N/A	N/A	N/A	3,637	N/A
Birch 5	B&S / NSR 2-6					6	
	FTG- 20					84	
	21 - 40					1,304	
	41 - 60					921	
	61 - 80					553	
	81 -100					569	
	101-120					745	
	121+					837	
	Forest Unit Subtotal	0	N/A	N/A	N/A	5,019	N/A
Other Hardwood 1	B&S / NSR 2-6					0	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					0	
	61 - 80					0	
	81 -100					8	
	101-120					0	
	121+					0	
	Forest Unit Subtotal	15	N/A	N/A	N/A	8	N/A
	TOTAL	31,408	N/A	N/A	N/A	731,733	N/A

The 2001-06 FMP (Table 5c), was the first planning period where volumes associated with available forest and protection forest can be provided on an age class basis. This information was not summarized in previous plans.

2006 Independent Forest Audit
Table 5c - Summary of Managed Productive Forest By Forest Unit (2001-2006)
MU: Lake Nipigon Forest

Forest Unit	Age Class	Protection Forest		Production Forest			
		(ha)	(m3)	Unavailable		Available	
				(ha)	(m3)	(ha)	(m3)
SpC	FTG- 20			101	0	41,873	0
	21 - 40			246	1,750	7,590	54,000
	41 - 60	5	160	424	14,043	21,213	702,566
	61 - 80	6	594	118	7,796	23,852	1,575,807
	81 -100	79		245	17,076	18,229	1,270,496
	101-120	233	28,086	179	18,672	18,704	1,951,049
	121-140	106	11,102	500	46,822	14,289	1,338,081
	141-160	150	14,345	324	28,838	12,370	1,101,005
	161-180	3	258	62	5,183	3,041	254,236
	181-200					491	34,370
	201+					154	9,958
	Forest Unit Subtotal	581	54,545	2,199	140,180	161,806	8,291,568
SpM	FTG- 20	7		0	0	8,438	0
	21 - 40			334	5,505	11,346	186,997
	41 - 60	65	3,546	115	6,274	25,439	1,387,966
	61 - 80	44	4,861	22	1,803	20,285	1,662,454
	81 -100	30	1,861	15	931	19,860	1,232,198
	101-120	57	7,498	106	12,078	18,925	2,156,301
	121-140	23	1,909	130	11,646	13,259	1,187,830
	141-160	7	371			11,302	708,335
	161-180	16	576			1,100	43,581
	181-200					76	2,210
	201+					499	8,013
	Forest Unit Subtotal	249	20,623	722	38,237	130,529	8,575,884
SpL	FTG- 20	51		136	0	25,653	0
	21 - 40	34		40	0	3,172	0
	41 - 60	181	362	8	5	4,197	2,802
	61 - 80	345	7,956	0	0	2,885	54,703
	81 -100	625	18,546	20	981	5,894	289,148
	101-120	2,944	228,326	134	8,814	13,219	869,459
	121-140	6,221	458,526	848	61,049	30,340	2,184,218
	141-160	7,469	496,020	714	47,455	20,518	1,363,686
	161-180	3,199	198,291	18	1,097	5,587	340,358
	181-200	66	3,432	104	5,406	363	18,870
	201+	72	2,952			251	10,266
	Forest Unit Subtotal	21,207	1,414,411	2,022	124,806	112,079	5,133,511
SpR	FTG- 20					273	0
	21 - 40	16	64			7	107
	41 - 60					683	25,336
	61 - 80					722	40,674
	81 -100	21	2,016			2,506	177,330
	101-120	59	5,606			1,963	185,044
	121-140	116	9,590			2,780	216,065
	141-160	262	16,170			4,003	263,103
	161-180	4	224			245	13,731
	181-200					10	495
	201+					78	3,234
	Forest Unit Subtotal	477	33,670	0	0	13,270	925,120

Poplar 2	B&S / NSR 2-6					6,704	
	FTG- 20					2,188	
	21 - 40					5,034	
	41 - 60					5,875	
	61 - 80					8,977	
	81 -100					4,321	
	101-120					5,739	
	121+					6,090	
Forest Unit Subtotal		827	N/A	N/A	N/A	44,928	N/A
Poplar 4	B&S / NSR 2-6					19	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					162	
	61 - 80					25	
	81 -100					154	
	101-120					719	
	121+					413	
Forest Unit Subtotal		157	N/A	N/A	N/A	1,492	N/A
Poplar 5	B&S / NSR 2-6					0	
	FTG- 20					0	
	21 - 40					74	
	41 - 60					175	
	61 - 80					611	
	81 -100					187	
	101-120					458	
	121+					318	
Forest Unit Subtotal		0	N/A	N/A	N/A	1,823	N/A
Birch 1	B&S / NSR 2-6					2,618	
	FTG- 20					2,652	
	21 - 40					8,303	
	41 - 60					8,724	
	61 - 80					4,726	
	81 -100					3,519	
	101-120					8,131	
	121+					7,519	
Forest Unit Subtotal		843	N/A	N/A	N/A	46,192	N/A
Birch 2	B&S / NSR 2-6					1,047	
	FTG- 20					405	
	21 - 40					1,589	
	41 - 60					2,228	
	61 - 80					2,566	
	81 -100					1,084	
	101-120					1,665	
	121+					730	
Forest Unit Subtotal		144	N/A	N/A	N/A	11,314	N/A
Birch 4	B&S / NSR 2-6					9	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					62	
	61 - 80					207	
	81 -100					338	
	101-120					679	
	121+					2,342	
Forest Unit Subtotal		722	N/A	N/A	N/A	3,637	N/A
Birch 5	B&S / NSR 2-6					6	
	FTG- 20					84	
	21 - 40					1,304	
	41 - 60					921	
	61 - 80					553	
	81 -100					569	
	101-120					745	
	121+					837	
Forest Unit Subtotal		0	N/A	N/A	N/A	5,019	N/A
Other Hardwood 1	B&S / NSR 2-6					0	
	FTG- 20					0	
	21 - 40					0	
	41 - 60					0	
	61 - 80					0	
	81 -100					8	
	101-120					0	
	121+					0	
Forest Unit Subtotal		15	N/A	N/A	N/A	8	N/A
	TOTAL	31,408	N/A	N/A	N/A	731,733	N/A

The 2001-06 FMP (Table 5c), was the first planning period where volumes associated with available forest and protection forest can be provided on an age class basis. This information was not summarized in previous plans.

2006 Independent Forest Audit
Table 5c - Summary of Managed Productive Forest By Forest Unit (2001-2006)
MU: Lake Nipigon Forest

Forest Unit	Age Class	Protection Forest		Production Forest			
				Unavailable		Available	
		(ha)	(m3)	(ha)	(m3)	(ha)	(m3)
SpC	FTG- 20			101	0	41,873	0
	21 - 40			246	1,750	7,590	54,000
	41 - 60	5	160	424	14,043	21,213	702,566
	61 - 80	6	594	118	7,796	23,852	1,575,807
	81 -100	79		245	17,076	18,229	1,270,496
	101-120	233	28,086	179	18,672	18,704	1,951,049
	121-140	106	11,102	500	46,822	14,289	1,338,081
	141-160	150	14,345	324	28,838	12,370	1,101,005
	161-180	3	258	62	5,183	3,041	254,236
	181-200					491	34,370
	201+					154	9,958
Forest Unit Subtotal		581	54,545	2,199	140,180	161,806	8,291,568
SpM	FTG- 20	7		0	0	8,438	0
	21 - 40			334	5,505	11,346	186,997
	41 - 60	65	3,546	115	6,274	25,439	1,387,966
	61 - 80	44	4,861	22	1,803	20,285	1,662,454
	81 -100	30	1,861	15	931	19,860	1,232,198
	101-120	57	7,498	106	12,078	18,925	2,156,301
	121-140	23	1,909	130	11,646	13,259	1,187,830
	141-160	7	371			11,302	708,335
	161-180	16	576			1,100	43,581
	181-200					76	2,210
	201+					499	8,013
Forest Unit Subtotal		249	20,623	722	38,237	130,529	8,575,884
SpL	FTG- 20	51		136	0	25,653	0
	21 - 40	34		40	0	3,172	0
	41 - 60	181	362	8	5	4,197	2,802
	61 - 80	345	7,956	0	0	2,885	54,703
	81 -100	625	18,546	20	981	5,894	289,148
	101-120	2,944	228,326	134	8,814	13,219	869,459
	121-140	6,221	458,526	848	61,049	30,340	2,184,218
	141-160	7,469	496,020	714	47,455	20,518	1,363,686
	161-180	3,199	198,291	18	1,097	5,587	340,358
	181-200	66	3,432	104	5,406	363	18,870
	201+	72	2,952			251	10,266
Forest Unit Subtotal		21,207	1,414,411	2,022	124,806	112,079	5,133,511
SpR	FTG- 20					273	0
	21 - 40	16	64			7	107
	41 - 60					683	25,336
	61 - 80					722	40,674
	81 -100	21	2,016			2,506	177,330
	101-120	59	5,606			1,963	185,044
	121-140	116	9,590			2,780	216,065
	141-160	262	16,170			4,003	263,103
	161-180	4	224			245	13,731
	181-200					10	495
	201+					78	3,234
Forest Unit Subtotal		477	33,670	0	0	13,270	925,120

PjC	FTG- 20					18,975	5,886
	21 - 40					7,423	108,655
	41 - 60	347	25,678			5,408	357,801
	61 - 80	68	8,040	62	6,029	7,879	766,227
	81 -100	79	11,613			1,046	90,055
	101-120					277	30,780
	121-140					286	14,950
	141-160	11	230	5	126	365	9,191
	161-180	18	396			88	1,921
	181-200						
	201+						
Forest Unit Subtotal		523	45,957	67	6,155	41,747	1,385,466
PjM	FTG- 20					3,936	0
	21 - 40					11,950	322,778
	41 - 60					4,379	389,763
	61 - 80	9	1,251	78	10,621	6,725	915,741
	81 -100					538	60,393
	101-120					566	88,725
	121-140					491	43,675
	141-160					214	6,812
	161-180					84	2,016
	181-200						
	201+					14	259
Forest Unit Subtotal		9	1,251	78	10,621	28,897	1,830,161
PjR	FTG- 20					18	0
	21 - 40						0
	41 - 60	23	736			127	3,263
	61 - 80	223	9,366				
	81 -100						
	101-120						
	121-140					22	941
	141-160						
	161-180					29	258
	181-200						
	201+						
Forest Unit Subtotal		245	10,102	0	0	196	4,462
BfM	FTG- 20					1,129	0
	21 - 40			19	265	504	7,026
	41 - 60			608	43,789	6,309	454,386
	61 - 80			45	4,940	3,645	400,101
	81 -100			58	6,018	1,425	147,862
	101-120			7	1,053	768	115,516
	121-140					13	852
	141-160						
	161-180						
	181-200						
	201+					19	643
Forest Unit Subtotal				737	56,065	13,812	1,126,385
BfR	FTG- 20						
	21 - 40						
	41 - 60					79	2,757
	61 - 80					128	9,860
	81 -100					1	135
	101-120						
	121-140						
	141-160						
	161-180						
	181-200						
	201+						
Forest Unit Subtotal						208	12,752
OcL	FTG- 20	32				511	0
	21 - 40			2	2	201	177
	41 - 60	15	75	4	11	565	1,540
	61 - 80	41	494			221	2,559
	81 -100	139	4,747	3	94	515	16,138
	101-120	372	21,518	84	4,742	934	52,730
	121-140	1,077	53,680	179	9,124	1,827	93,124
	141-160	1,727	73,662	111	4,870	2,048	89,858
	161-180	1,230	46,392			925	34,329
	181-200	22	704			43	1,472
	201+					186	5,601
Forest Unit Subtotal		4,654	201,272	383	18,843	7,976	297,528

PoHD	FTG- 20					11,451	0
	21 - 40					1,250	40,686
	41 - 60			5	349	1,833	127,805
	61 - 80			37	4,830	3,533	461,208
	81 -100			58	6,549	2,460	277,782
	101-120					2,308	356,480
	121-140					2,051	115,588
	141-160					718	10,593
	161-180						
	181-200						
	201+					32	256
Forest Unit Subtotal				100	11,728	25,636	1,390,398
PoHS	FTG- 20	138				1,419	0
	21 - 40					75	871
	41 - 60	79	5,767	1	59	1,766	104,634
	61 - 80	615	54,955			1,417	128,311
	81 -100	153	6,896			670	50,328
	101-120					1,459	101,685
	121-140					1,132	18,700
	141-160	9	72			555	4,328
	161-180					19	134
	181-200						
	201+						
Forest Unit Subtotal		993	67,690	1	59	8,512	408,992
PoM	FTG- 20	784				11,250	0
	21 - 40			39	734	8,596	161,698
	41 - 60	797	61,245			15,338	995,827
	61 - 80	1,742	184,124	3	307	13,000	1,329,343
	81 -100	486	66,166	11	1,141	6,307	654,129
	101-120	531	67,014			9,812	1,170,212
	121-140	307	14,700	21	1,160	8,366	462,138
	141-160					2,390	55,754
	161-180					505	8,377
	181-200						
	201+					158	1,891
Forest Unit Subtotal		4,647	393,249	74	3,341	75,722	4,839,368
PoR	FTG- 20					34	0
	21 - 40						
	41 - 60					12	280
	61 - 80						
	81 -100					10	990
	101-120						
	121-140						
	141-160						
	161-180						
	181-200						
	201+						
Forest Unit Subtotal						56	1,270
BwH	FTG- 20	26				5,316	0
	21 - 40					1,661	13,321
	41 - 60	61	2,087			7,834	221,257
	61 - 80	399	22,715			4,772	242,966
	81 -100	208	13,855			3,370	221,271
	101-120	45	3,610	11	673	1,232	75,386
	121-140					1,336	80,960
	141-160	13	429			1,113	36,070
	161-180	19	285			50	698
	181-200						
	201+					34	372
Forest Unit Subtotal		771	42,981	11	673	26,718	892,299
BwM	FTG- 20	32				2,470	0
	21 - 40			61	441	3,407	24,624
	41 - 60	92	2,215			7,362	255,800
	61 - 80	203	12,961			4,660	238,658
	81 -100	314	24,352			4,877	319,344
	101-120	262	21,656	44	3,599	4,974	406,868
	121-140	21	1,284			3,278	187,781
	141-160					1,989	61,870
	161-180					290	5,502
	181-200						
	201+					37	444
Forest Unit Subtotal		924	62,468	105	4,040	33,345	1,500,891

PjC	FTG- 20					18,975	5,886
	21 - 40					7,423	108,655
	41 - 60	347	25,678			5,408	357,801
	61 - 80	68	8,040	62	6,029	7,879	766,227
	81 -100	79	11,613			1,046	90,055
	101-120					277	30,780
	121-140					286	14,950
	141-160	11	230	5	126	365	9,191
	161-180	18	396			88	1,921
	181-200						
	201+						
Forest Unit Subtotal		523	45,957	67	6,155	41,747	1,385,466
PjM	FTG- 20					3,936	0
	21 - 40					11,950	322,778
	41 - 60					4,379	389,763
	61 - 80	9	1,251	78	10,621	6,725	915,741
	81 -100					538	60,393
	101-120					566	88,725
	121-140					491	43,675
	141-160					214	6,812
	161-180					84	2,016
	181-200						
	201+					14	259
Forest Unit Subtotal		9	1,251	78	10,621	28,897	1,830,161
PjR	FTG- 20					18	0
	21 - 40						0
	41 - 60	23	736			127	3,263
	61 - 80	223	9,366				
	81 -100						
	101-120						
	121-140					22	941
	141-160						
	161-180					29	258
	181-200						
	201+						
Forest Unit Subtotal		245	10,102	0	0	196	4,462
BfM	FTG- 20					1,129	0
	21 - 40			19	265	504	7,026
	41 - 60			608	43,789	6,309	454,386
	61 - 80			45	4,940	3,645	400,101
	81 -100			58	6,018	1,425	147,862
	101-120			7	1,053	768	115,516
	121-140					13	852
	141-160						
	161-180						
	181-200						
	201+					19	643
Forest Unit Subtotal				737	56,065	13,812	1,126,385
BfR	FTG- 20						
	21 - 40						
	41 - 60					79	2,757
	61 - 80					128	9,860
	81 -100					1	135
	101-120						
	121-140						
	141-160						
	161-180						
	181-200						
	201+						
Forest Unit Subtotal						208	12,752
OcL	FTG- 20	32				511	0
	21 - 40			2	2	201	177
	41 - 60	15	75	4	11	565	1,540
	61 - 80	41	494			221	2,559
	81 -100	139	4,747	3	94	515	16,138
	101-120	372	21,518	84	4,742	934	52,730
	121-140	1,077	53,680	179	9,124	1,827	93,124
	141-160	1,727	73,662	111	4,870	2,048	89,858
	161-180	1,230	46,392			925	34,329
	181-200	22	704			43	1,472
	201+					186	5,601
Forest Unit Subtotal		4,654	201,272	383	18,843	7,976	297,528

PoHD	FTG- 20					11,451	0
	21 - 40					1,250	40,686
	41 - 60			5	349	1,833	127,805
	61 - 80			37	4,830	3,533	461,208
	81 -100			58	6,549	2,460	277,782
	101-120					2,308	356,480
	121-140					2,051	115,588
	141-160					718	10,593
	161-180						
	181-200						
	201+					32	256
Forest Unit Subtotal				100	11,728	25,636	1,390,398
PoHS	FTG- 20	138				1,419	0
	21 - 40					75	871
	41 - 60	79	5,767	1	59	1,766	104,634
	61 - 80	615	54,955			1,417	128,311
	81 -100	153	6,896			670	50,328
	101-120					1,459	101,685
	121-140					1,132	18,700
	141-160	9	72			555	4,328
	161-180					19	134
	181-200						
	201+						
Forest Unit Subtotal		993	67,690	1	59	8,512	408,992
PoM	FTG- 20	784				11,250	0
	21 - 40			39	734	8,596	161,698
	41 - 60	797	61,245			15,338	995,827
	61 - 80	1,742	184,124	3	307	13,000	1,329,343
	81 -100	486	66,166	11	1,141	6,307	654,129
	101-120	531	67,014			9,812	1,170,212
	121-140	307	14,700	21	1,160	8,366	462,138
	141-160					2,390	55,754
	161-180					505	8,377
	181-200						
	201+					158	1,891
Forest Unit Subtotal		4,647	393,249	74	3,341	75,722	4,839,368
PoR	FTG- 20					34	0
	21 - 40						
	41 - 60					12	280
	61 - 80						
	81 -100					10	990
	101-120						
	121-140						
	141-160						
	161-180						
	181-200						
	201+						
Forest Unit Subtotal						56	1,270
BwH	FTG- 20	26				5,316	0
	21 - 40					1,661	13,321
	41 - 60	61	2,087			7,834	221,257
	61 - 80	399	22,715			4,772	242,966
	81 -100	208	13,855			3,370	221,271
	101-120	45	3,610	11	673	1,232	75,386
	121-140					1,336	80,960
	141-160	13	429			1,113	36,070
	161-180	19	285			50	698
	181-200						
	201+					34	372
Forest Unit Subtotal		771	42,981	11	673	26,718	892,299
BwM	FTG- 20	32				2,470	0
	21 - 40			61	441	3,407	24,624
	41 - 60	92	2,215			7,362	255,800
	61 - 80	203	12,961			4,660	238,658
	81 -100	314	24,352			4,877	319,344
	101-120	262	21,656	44	3,599	4,974	406,868
	121-140	21	1,284			3,278	187,781
	141-160					1,989	61,870
	161-180					290	5,502
	181-200						
	201+					37	444
Forest Unit Subtotal		924	62,468	105	4,040	33,345	1,500,891

BwR	FTG- 20						
	21 - 40						
	41 - 60					46	288
	61 - 80					134	2,109
	81 -100					512	23,792
	101-120					7	
	121-140						
	141-160						
	161-180						
	181-200						
	201+					10	173
Forest Unit Subtotal						709	26,362
CPFR	FTG- 20			11	0	4,701	0
	21 - 40					144	1,885
	41 - 60					3,678	155,449
	61 - 80	116	7,523			5,961	386,606
	81 -100					3,948	262,401
	101-120					3,829	357,409
	121-140	26	2,054			4,304	340,009
	141-160					5,838	373,525
	161-180					495	27,155
	181-200					9	446
	201+						
Forest Unit Subtotal		142	9,577	11	0	32,907	1,904,886
Pr	FTG- 20					12	0
	21 - 40						
	41 - 60					112	7,317
	61 - 80						
	81 -100						
	101-120						
	121-140					5	575
	141-160						
	161-180						
	181-200						
	201+						
Forest Unit Subtotal						129	7,892
Oh	FTG- 20						
	21 - 40						
	41 - 60						
	61 - 80						
	81 -100					9	978
	101-120						
	121-140						
	141-160	15	1,125				0
	161-180						
	181-200						
	201+						
Forest Unit Subtotal		15	1,125			9	978
All Forest Units Total	FTG- 20	1,069	0	248	0	137,459	5,886
	21 - 40	49	64	741	8,696	57,326	922,825
	41 - 60	1,664	101,871	1,165	64,531	106,380	5,196,838
	61 - 80	3,810	314,840	365	36,326	99,819	8,217,327
	81 -100	2,133	150,052	410	32,790	72,177	5,094,768
	101-120	4,503	383,314	565	49,630	78,977	7,917,644
	121-140	7,895	552,845	1,678	129,801	83,779	6,285,486
	141-160	9,663	602,424	1,154	81,289	63,423	4,084,129
	161-180	4,488	246,422	80	6,280	12,458	732,296
	181-200	88	4,136	104	5,406	992	57,863
	201+	72	2,952	0	0	1,472	41,110
	Grand Total	35,436	2,358,921	6,510	414,749	714,263	38,556,173

Source: Table FMP-9 from the Lake Nipigon Forest 2001-2006 FMP

The "Unavailable" Crown Managed Production Forest in Table 5d (2006-11 FMP) has increased significantly from the previous term. This is a reflection of how the seven conservation reserves associated with OLL Land Use Strategy (introduced in Section 2.1 of this report) have been represented in SFMM modeling.

BwR	FTG- 20						
	21 - 40						
	41 - 60					46	288
	61 - 80					134	2,109
	81 -100					512	23,792
	101-120					7	
	121-140						
	141-160						
	161-180						
	181-200						
	201+					10	173
Forest Unit Subtotal						709	26,362
CPFR	FTG- 20			11	0	4,701	0
	21 - 40					144	1,885
	41 - 60					3,678	155,449
	61 - 80	116	7,523			5,961	386,606
	81 -100					3,948	262,401
	101-120					3,829	357,409
	121-140	26	2,054			4,304	340,009
	141-160					5,838	373,525
	161-180					495	27,155
	181-200					9	446
	201+						
Forest Unit Subtotal		142	9,577	11	0	32,907	1,904,886
Pr	FTG- 20					12	0
	21 - 40						
	41 - 60					112	7,317
	61 - 80						
	81 -100						
	101-120						
	121-140					5	575
	141-160						
	161-180						
	181-200						
	201+						
Forest Unit Subtotal						129	7,892
	FTG- 20						
	21 - 40						
	41 - 60						
	61 - 80						
Oh	81 -100					9	978
	101-120						
	121-140						
	141-160	15	1,125				0
	161-180						
	181-200						
	201+						
Forest Unit Subtotal		15	1,125			9	978
	FTG- 20	1,069	0	248	0	137,459	5,886
	21 - 40	49	64	741	8,696	57,326	922,825
	41 - 60	1,664	101,871	1,165	64,531	106,380	5,196,838
	61 - 80	3,810	314,840	365	36,326	99,819	8,217,327
All Forest Units Total	81 -100	2,133	150,052	410	32,790	72,177	5,094,768
	101-120	4,503	383,314	565	49,630	78,977	7,917,644
	121-140	7,895	552,845	1,678	129,801	83,779	6,285,486
	141-160	9,663	602,424	1,154	81,289	63,423	4,084,129
	161-180	4,488	246,422	80	6,280	12,458	732,296
	181-200	88	4,136	104	5,406	992	57,863
	201+	72	2,952	0	0	1,472	41,110
	Grand Total	35,436	2,358,921	6,510	414,749	714,263	38,556,173

Source: Table FMP-9 from the Lake Nipigon Forest 2001-2006 FMP

The "Unavailable" Crown Managed Production Forest in Table 5d (2006-11 FMP) has increased significantly from the previous term. This is a reflection of how the seven conservation reserves associated with OLL Land Use Strategy (introduced in Section 2.1 of this report) have been represented in SFMM modeling.

2006 Independent Forest Audit
Table 5d - Summary of Managed Productive Forest By Forest Unit (2006-2011)
MU: Lake Nipigon Forest

Forest Unit	Age Class	Protection Forest		Production Forest			
				Unavailable		Available	
		(ha)	(m3)	(ha)	(m3)	(ha)	(m3)
BfM	FTG- 20	0	0	0	0	1,265	0
	21 - 40	0	0	648	14,260	6,065	252,538
	41 - 60	0	0	209	18,619	3,974	353,704
	61 - 80	0	0	400	58,771	5,494	807,662
	81 -100	0	0	13	2,366	1,626	295,877
	101-120	0	0	37	6,605	73	13,049
	121-140	0	0	0	0	2	150
	141-160	0	0	0	0	18	722
	161-180	0	0	0	0	0	0
	181-200	0	0	0	0	0	0
	201+	0	0	0	0	0	0
Forest Unit Subtotal		0	0	1,307	100,621	18,516	1,723,702
BwH	FTG- 20	0	0	0	0	2,061	0
	21 - 40	0	0	86	1,798	2,207	49,052
	41 - 60	266	22,619	322	27,328	7,378	627,156
	61 - 80	50	6,537	3,295	431,593	10,941	1,433,206
	81 -100	78	12,371	6,221	982,934	13,623	2,152,387
	101-120	25	3,985	1,630	263,995	2,894	468,812
	121-140	26	3,084	131	15,720	79	9,420
	141-160	0	0	0	0	118	6,367
	161-180	0	0	0	0	0	0
	181-200	0	0	0	0	0	0
	201+	0	0	0	0	0	0
Forest Unit Subtotal		445	48,596	11,683	1,723,367	39,300	4,746,398
BwM	FTG- 20	0	0	67	0	2,974	0
	21 - 40	0	0	3	59	1,323	25,141
	41 - 60	0	0	129	9,410	5,188	378,688
	61 - 80	25	3,025	791	95,651	4,322	522,914
	81 -100	77	12,119	2,503	395,474	10,076	1,592,008
	101-120	32	5,136	636	101,680	1,852	296,352
	121-140	13	1,430	39	4,268	141	15,499
	141-160	8	464	0	0	4	255
	161-180	0	0	0	0	0	0
	181-200	0	0	0	0	0	0
	201+	0	0	0	0	0	0
Forest Unit Subtotal		155	22,174	4,166	606,541	25,880	2,830,856
CeUp	FTG- 20	0	0	0	0	98	0
	21 - 40	0	0	0	0	0	0
	41 - 60	0	0	0	0	429	27,885
	61 - 80	0	0	65	7,829	589	71,305
	81 -100	28	4,629	191	31,100	995	162,218
	101-120	0	0	202	35,165	256	44,544
	121-140	0	0	54	7,826	341	49,728
	141-160	0	0	323	37,826	1,004	117,491
	161-180	0	0	179	17,363	241	23,358
	181-200	0	0	0	0	0	0
	201+	0	0	18	3,815	35	7,565
Forest Unit Subtotal		28	4,629	1,031	140,924	3,988	504,093
OcL	FTG- 20	0	0	23	0	1,467	0
	21 - 40	0	0	0	0	280	0
	41 - 60	2	5	23	45	923	1,847
	61 - 80	85	2,822	179	5,897	757	24,978
	81 -100	219	19,263	54	4,787	587	51,682
	101-120	1,124	128,113	57	6,452	200	22,846
	121-140	5,958	661,371	269	29,892	2,171	241,014
	141-160	4,941	484,208	370	36,280	10,566	1,035,458
	161-180	135	11,340	2	168	700	58,792
	181-200	0	0	16	1,153	3	204
	201+	0	0	0	0	21	3,519
Forest Unit Subtotal		12,465	1,307,122	992	84,675	17,676	1,440,340

PjC	FTG- 20	0	0	8	8	11,770	11,770
	21 - 40	0	0	8	388	11,437	587,296
	41 - 60	18	2,566	5	677	5,138	724,472
	61 - 80	114	27,792	207	50,435	9,801	2,391,444
	81 -100	4	1,248	63	20,032	5,273	1,687,360
	101-120	4	1,099	75	23,487	116	36,518
	121-140	0	0	87	14,446	644	107,615
	141-160	12	767	14	884	466	30,303
	161-180	0	0	8	2,990	6	312
	181-200	0	0	0	0	0	0
	201+	0	0	0	0	0	0
	Forest Unit Subtotal	151	33,472	522	113,346	44,651	5,577,089
PjM	FTG- 20	0	0	18	0	2,330	0
	21 - 40	0	0	5	261	8,645	501,393
	41 - 60	0	0	20	3,227	9,255	1,508,598
	61 - 80	66	17,371	65	17,135	6,827	1,788,622
	81 -100	0	0	102	33,485	4,231	1,383,537
	101-120	0	0	14	4,368	498	155,501
	121-140	0	0	9	1,380	821	123,075
	141-160	0	0	92	4,876	365	19,319
	161-180	0	0	15	588	0	0
	181-200	0	0	0	0	0	0
	201+	0	0	0	0	0	0
	Forest Unit Subtotal	66	17,371	340	65,320	32,971	5,480,043
PoHP	FTG- 20	0	0	53	0	1,938	0
	21 - 40	0	0	0	0	140	5,222
	41 - 60	89	10,882	8	988	1,351	164,810
	61 - 80	38	7,258	33	6,180	2,742	518,181
	81 -100	34	7,362	117	25,081	3,011	644,247
	101-120	6	1,139	69	13,375	1,158	223,513
	121-140	0	0	0	0	75	4,794
	141-160	0	0	0	0	0	0
	161-180	0	0	0	0	0	0
	181-200	0	0	0	0	0	0
	201+	0	0	0	0	0	0
	Forest Unit Subtotal	168	26,640	281	45,624	10,414	1,560,767
PoHR	FTG- 20	0	0	186	0	5,771	0
	21 - 40	0	0	20	1,720	2,379	221,665
	41 - 60	0	0	35	8,284	4,709	1,101,953
	61 - 80	0	0	261	87,301	4,781	1,601,468
	81 -100	0	0	247	93,424	4,543	1,721,911
	101-120	0	0	325	110,655	4,864	1,658,556
	121-140	0	0	12	1,333	1,182	132,362
	141-160	0	0	0	0	11	253
	161-180	0	0	0	0	0	0
	181-200	0	0	0	0	6	75
	201+	0	0	0	0	0	0
	Forest Unit Subtotal	0	0	1,085	302,715	28,246	6,438,242
PoM	FTG- 20	0	0	242	0	5,921	0
	21 - 40	0	0	41	1,528	4,490	166,115
	41 - 60	6	780	46	5,993	12,723	1,653,925
	61 - 80	75	15,069	254	51,369	8,188	1,653,956
	81 -100	127	30,559	329	79,193	9,491	2,287,235
	101-120	38	8,664	767	174,944	10,060	2,293,657
	121-140	0	0	89	8,791	2,089	206,841
	141-160	0	0	31	1,232	129	5,152
	161-180	0	0	0	0	0	0
	181-200	0	0	0	0	0	0
	201+	0	0	0	0	0	0
	Forest Unit Subtotal	245	55,072	1,800	323,050	53,090	8,266,881
PrwM	FTG- 20	0	0	0	0	77	0
	21 - 40	0	0	0	0	20	628
	41 - 60	0	0	0	0	286	26,340
	61 - 80	0	0	0	0	125	18,485
	81 -100	0	0	0	0	0	0
	101-120	0	0	0	0	6	1,318
	121-140	0	0	0	0	20	4,019
	141-160	0	0	0	0	0	0
	161-180	0	0	0	0	0	0
	181-200	0	0	0	0	0	0
	201+	0	0	0	0	0	0
	Forest Unit Subtotal	0	0	0	0	535	50,791

SpC	FTG- 20	0	0	100	0	42,210	0
	21 - 40	0	0	189	3,397	15,407	322,146
	41 - 60	7	551	210	16,994	17,058	1,381,682
	61 - 80	181	31,477	3,261	567,344	26,430	4,598,768
	81 -100	156	36,099	3,757	871,717	29,552	6,855,948
	101-120	14	3,398	2,349	566,133	20,018	4,824,410
	121-140	227	49,604	1,222	267,552	18,255	3,997,779
	141-160	14	2,783	1,270	248,900	17,442	3,418,710
	161-180	0	0	189	33,110	1,712	299,618
	181-200	0	0	0	0	12	1,851
	201+	0	0	0	0	0	0
	Forest Unit Subtotal	598	123,911	12,546	2,575,147	188,095	25,700,912
SpL	FTG- 20	0	0	11	0	17,164	0
	21 - 40	0	0	105	0	10,846	0
	41 - 60	0	0	126	377	10,577	31,730
	61 - 80	419	38,511	891	82,000	7,294	671,066
	81 -100	611	95,896	329	51,716	2,379	373,487
	101-120	941	158,978	225	37,991	1,359	229,722
	121-140	15,295	2,493,052	648	105,559	15,299	2,493,737
	141-160	9,979	1,476,907	1,730	256,084	50,617	7,491,301
	161-180	185	23,878	329	42,467	6,106	787,648
	181-200	0	0	9	974	31	3,328
	201+	4	804	0	0	0	0
	Forest Unit Subtotal	27,433	4,288,026	4,403	577,167	121,672	12,082,019
SpM	FTG- 20	0	0	450	0	19,258	0
	21 - 40	0	0	2	63	4,650	195,300
	41 - 60	52	7,912	279	42,069	28,750	4,341,190
	61 - 80	36	8,306	5,579	1,294,398	32,183	7,466,456
	81 -100	138	37,452	7,846	2,126,347	48,739	13,208,242
	101-120	7	1,816	5,845	1,584,022	25,190	6,826,382
	121-140	0	0	656	138,332	5,354	1,129,715
	141-160	0	0	458	77,419	4,619	780,577
	161-180	0	0	36	5,263	594	87,333
	181-200	0	0	0	0	0	0
	201+	0	0	0	0	0	0
	Forest Unit Subtotal	233	55,486	21,150	5,267,912	169,336	34,035,194
All Forest Units Total	FTG- 20	0	0	1,156	8	114,303	11,770
	21 - 40	0	0	1,105	23,473	67,888	2,326,495
	41 - 60	441	45,315	1,410	134,009	107,739	12,323,977
	61 - 80	1,089	158,166	15,279	2,755,901	120,472	23,568,510
	81 -100	1,472	256,998	21,773	4,717,655	134,125	32,416,139
	101-120	2,189	312,328	12,230	2,928,874	68,546	17,095,180
	121-140	21,518	3,208,541	3,214	595,098	46,472	8,515,748
	141-160	14,954	1,965,129	4,288	663,501	85,359	12,905,908
	161-180	320	35,218	807	101,948	9,359	1,257,060
	181-200	0	0	25	2,127	52	5,459
	201+	4	804	18	3,815	55	11,084
	Grand Total	41,988	5,982,499	61,305	11,926,409	754,369	110,437,328

Source: Table FMP-9 from the Lake Nipigon Forest 2006-11 FMP

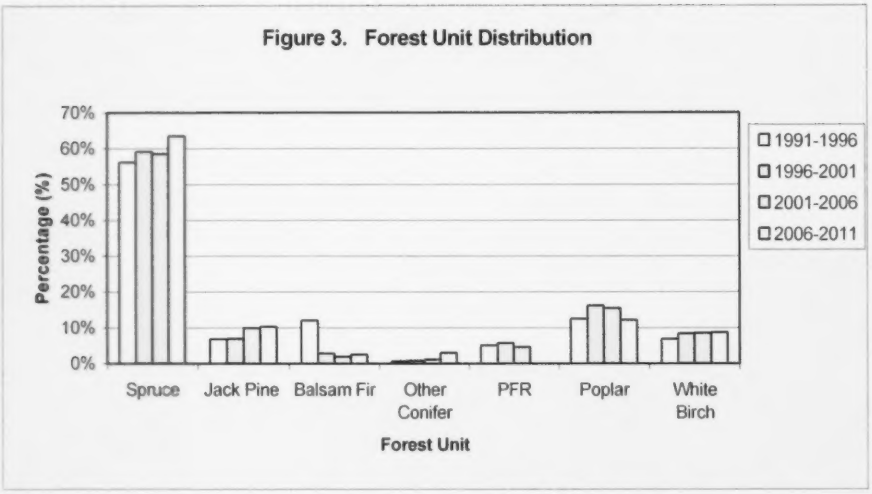
The purpose of this summary is to aid in the assessment of forest condition over time, and determine if there are significant changes in forest unit area (conversions) or major age class shifts, resulting from forest management activities. Silvicultural and forest management activities (harvesting, regeneration and free-to-grow activities) have contributed in part to the changes in area occupied by each forest unit over three planning periods. But a number of other contributing factors have actually had more influence in forest unit conversions, including:

- Use of different forest unit criteria over time;
- Updates to the planning inventory to reflect changes to base features;
- Natural disturbance (wildfires);
- Withdrawals associated with Ontario's Living Legacy Land Use Strategy;
- Changes to the land ownership classifications associated with the amalgamation;
- The manner in which the B&S and depleted areas have been represented in SFMM; and
- The spruce budworm infestation.

There was very little change in the Crown managed productive forest area between 1991 and 1996 for protection forest, which only varied 128 hectares (0.41%), or for available productive forest area, which differed by 4,032 hectares (0.55%). These minor changes were primarily due to FRI updating. More significant differences in total productive forest area are first evident in Table 5c, due to the landbase changes associated with the OLL Land Use Strategy and the amalgamation of Lake Nipigon Forest with the Auden Forest and portions of other former MUs, and in Table 5d, due to using a new FRI along with updated base features.

It can be difficult to appreciate the significance of the changes that have occurred on this management unit, simply by viewing the data provided in the tables. Supplementary graphs have been prepared to aid in analyzing Tables 5a to 5d, and to better understand the reasons for the differences that have occurred in forest unit area and age class structure. The two bar graphs (Figures 3 and 4), demonstrate the proportions (%) and areas (hectares) of productive forest that are occupied by each forest unit, through time. For ease of comparison, the forest units were grouped on the basis of broader working groups or by stand type (in the case of PFR).

Figure 3. Forest Unit Distribution



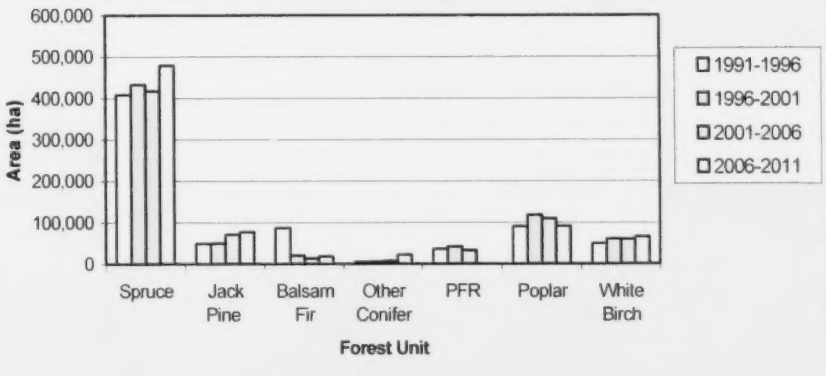
The proportional distribution of forest units on the Lake Nipigon Forest has been portrayed in the upper chart. Recognizing the land base changes that have occurred (amalgamation and landbase withdrawals) and that a new FRI was used in the 2006-11 FMP, with few exceptions the forest unit distribution has generally not varied a great deal from one term to another. For example, the proportion of the entire productive forest occupied by Spruce forest units has remained fairly stable between 1991 and 2001, fluctuating between 56-59%. In fact, with the exception of balsam fir, none of the forest units have fluctuated more than 4% in their distribution on the management unit in the first three planning terms.

As discussed previously, with the use of the new 1995 FRI in the preparation of the 2006-11 FMP, some differences in the major land types resulted. The total water area and non-productive forest area was reduced, and the area of Crown Managed Total Production Forest increased (by about 4.7%). These changes were due for the most part to the incorporation of the new FRI, as well as differences associated with the base feature data in the planning inventory (less buffers associated with streams and roads, water, management unit boundary and ownership layers, etc.). As a result, and as portrayed in Figures 3 and 4, there have been noticeable increases in all forest units except poplar, in the 2006-11 columns.

Balsam fir shows the most significant proportional change, with a dramatic reduction between 1991 and 1996. The loss in area of approximately 67,000 hectares in balsam fir (representing a 77% loss within its own forest unit), amounted to a 9% loss of balsam fir across the Forest. As mentioned in Section 2.1, the FRI updates made in preparation for the 1996-2001 FMP included conversions of the balsam fir forest units to other forest units, to reflect the damage incurred by spruce budworm. Approximately 50% of the

balsam fir working group was converted to the spruce working group, with smaller increases in other working groups (24% converted to poplar and 16% converted to birch).

Figure 4. Forest Unit Area



Two other line graphs (Figures 5 and 6) plot the age class distribution for the available production forest land over the same timeframe. Figure 5 portrays the distribution by proportion of area, and Figure 6 plots the total area occupying each age class. Age class data was not available for protection forest or Crown managed unavailable production forest. To ensure that all productive forest area less than 20 years of age was accounted for and treated in a consistent fashion, the B&S/NSR areas (unique to Tables 5a and 5b), were added to the FTG-20 age class. Similarly, all areas occupying the older age classes in Table 5c and 5d were aggregated and included in the "121+" category.

Figure 5. Age Class Distribution (All Forest Units)

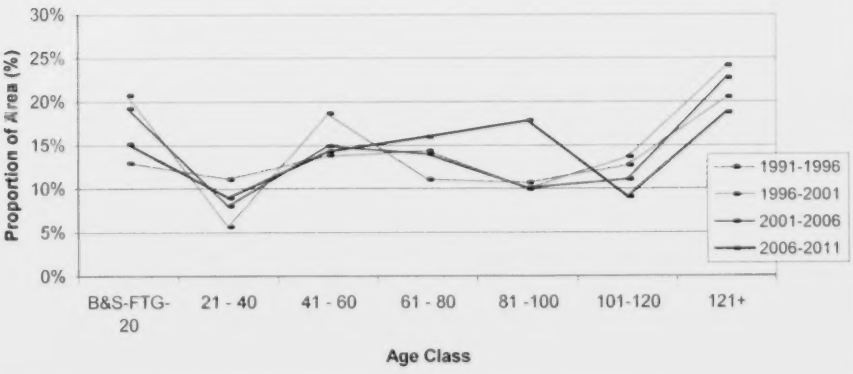
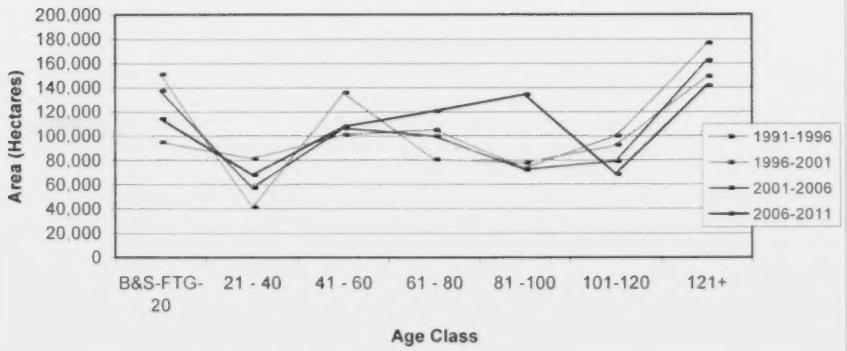


Figure 5 suggests that proportionally, the area occupying each age class was fairly consistent for the first three planning terms (from 1991 to 2001). The peaks and troughs portrayed for 1991-96 (the red line) are somewhat more extreme, but the pattern is similar to the next two periods (the green and blue lines). With the passage of five years, the proportion of area occupying the youngest age class moves into and increases the 21-40 age class. A similar reduction takes place in the 41-60 age class, with a corresponding increase in the 61-80 age class in 1996. The black line representing the age class distribution in 2006 is distinctly different than the other three. Much higher proportions occupy the 61-80 and 81-100 age classes at this time. This is a reflection of the new 1995 FRI being used, where many

older growth stands have succeeded in the absence of disturbance, and the age calls made by the photo-interpreter have been made on the previously sub-dominant canopy which became the dominant stand cover.

The total areas of Crown Managed Productive Forest have actually remained fairly stable, varying only +/- 5%, discounting how the conservation reserves have been represented in SFMM modeling (60,700 hectares). This accounts for the consistency of patterns between the two age class graphs. The patterns for the first three planning terms in Figure 6 are very similar to those in the Figure 5, with more pronounced differences becoming apparent in 2006.

Figure 6. Age Class Distribution by Area (All Forest Units)



The IFAPP requires a discussion on how forest unit conversions or age class changes will, or have affected, TMP or FMP objectives. It is somewhat difficult to comment on the achievement of management objectives related to forest condition over a 15-year period, considering the long-term nature of these particular objectives and the fundamental changes that have occurred in forest management planning direction in Ontario, in response to new legislation – the Crown Forest Sustainability Act (CFSA). This difficulty is compounded by a number of unplanned occurrences that have affected the Lake Nipigon Forest such as natural disturbances, and other influences such as amalgamation, land base changes and the incorporation of a new FRI.

The "sustained yield" objectives developed for the 1991-96 and 1996-2001 TMPs for both the former Lake Nipigon and Auden Forests were very similar, essentially to ensure that the forests were being managed to produce a continuous and predictable supply of fibre to meet the needs of dependent mills. In support of achieving these objectives, sustained yield strategies were developed, one component of which being a "forest regulation strategy". The intent of regulation was to produce a more balanced (normalized) age class structure, while accommodating any critical imbalances in the current age class structure.

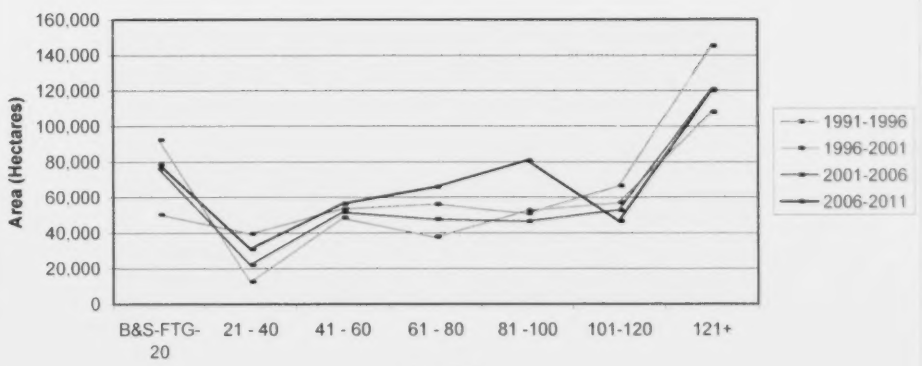
During the preparation of the 1991-96 and 1996-2001 FMPs for the former Lake Nipigon Forest, the spruce working group, the predominate species on the production forest, was heavily skewed to the oldest age class (121+). This overmature condition was identified as an issue in both plans, especially in the upland forest unit (Sp1), where volumes would likely decline significantly with time. This condition was much less pronounced on the former Auden Forest.

Although management objectives and strategies have since changed, it is interesting to note that the age class distribution for the spruce forest units have in fact, marginally approached a more normal forest condition over time. Figure 7, plotting spruce forest units only, demonstrates that in 2006 less area occupies the two oldest age classes (101-120 and 121+), and more area occupies the four younger age classes (from 21-40 to 81-100), albeit with a slightly skewed amount in the 81-100 age class. Again, it

must be recognized that other factors (such as using an updated FRI) have had more influence on these results than forest management activities.

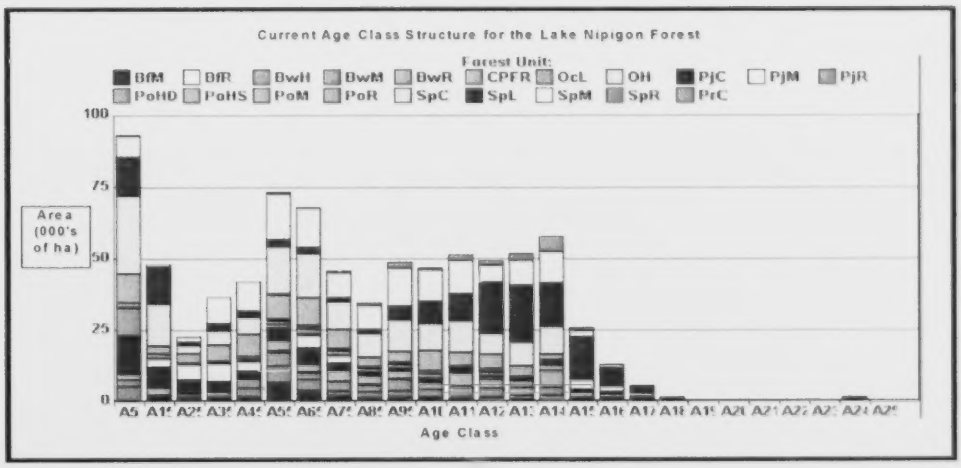
The objectives and strategies developed for the 2001-06 FMP regarding age class structure have changed dramatically from those in the previous plans, primarily to meet the requirements of the new Forest Management Planning Manual, 1996 (FMPM) and direction outlined in the CFSA. This new direction required forest managers to maintain Crown forest health by using forest practices which emulate, within the bounds of silvicultural requirements, natural disturbances and landscape patterns.

Figure 7. Age Class Distribution by Area (Spruce)



The "current" age class structure in 2001 is portrayed in Figure 8. It should be noted that this chart is different than Figures 5 through 7, in that it uses 10-year age classes, there is no "capping" at the 121+ age class, and the entire forest area is represented (rather than just Crown Managed ownerships). Nevertheless, it portrays that an unnatural age distribution exists on the Forest, with more area occupying the middle age classes.

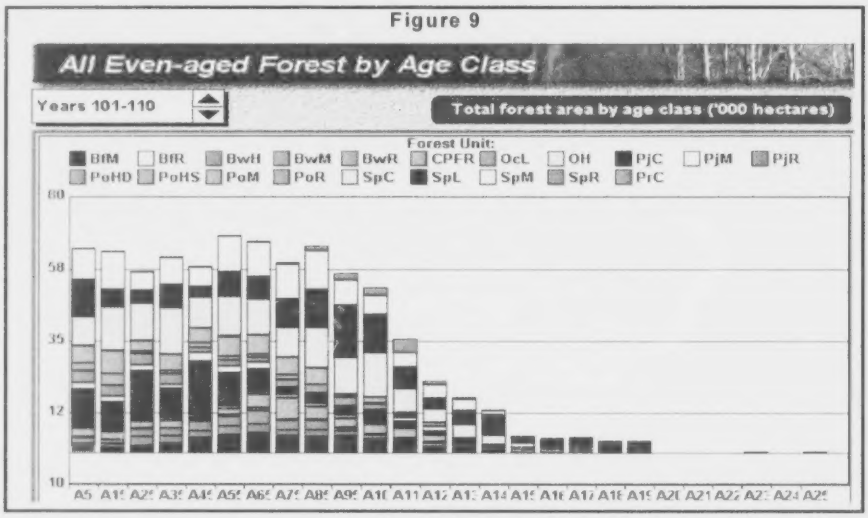
Figure 8



The 2001-06 FMP planning team's stated objective was: "To maintain forest diversity within the bounds of natural variation". The measure of objective achievement was to move the forest unit areas to a sustainable target level within approximately 100 years, while maintaining a portion of area in older forest. In other words, the desired future age class structure of the selected management alternative (which would be reached in 100 years), would be a "normalized" forest, with an old growth tail.

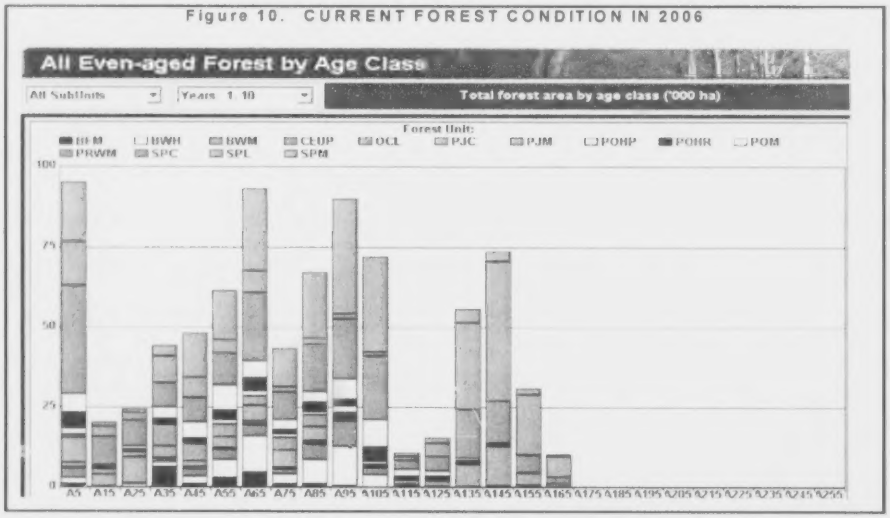
The strategies to achieve this objective were implemented through strategic modeling using SFMM. The basic concept of this approach is that if the forest management activities (harvest, renewal and tending) closely follow the SFMM model results over time, the current forest conditions should move toward the desired forest conditions. The desired future forest condition of the selected management alternative for the 2001-06 FMP is shown in Figure 9. It demonstrates the achievement of this objective given that there is a relatively equal amount of area in each age class, while maintaining an old growth "tail". (This graph was portrayed as the projected age class structure target in Table FMP-12 of the 2001-06 FMP). As the title of the SFMM screen indicates, this objective is based on "All Even-aged Forest", which includes all available and reserved forest, for all land ownerships.

Figure 9



A similar SFMM screen portraying the age class structure of the current forest condition in 2006 is provided in Figure 10. This graph paints a dramatically different picture than the current forest condition represented for 2001, in Figure 8. The patterns of this chart mimic the patterns presented earlier with the black line in Figure 6, but are somewhat difficult to discern with the different age classes being used. The low points in the 10-30 and 110-130 age classes in Figure 10 correspond respectively with the "valleys" in the 21-40 and 101-120 age classes in Figure 6.

Figure 10. CURRENT FOREST CONDITION IN 2006



Again, the disproportionately high amount of area in the 80-110 age classes in the new FRI is a reflection the former stands (of the previous FRI) succeeding in the absence of disturbance, and the formerly sub-dominant understory being represented as the new dominant stand cover.

With the information at hand, it is difficult at this time to determine if forest management activities that have occurred over the past 5-year period have had any influence (positive or negative) towards reaching the desired future forest conditions (as defined in the 2001-06 FMP).

2.6 Summary Report of Renewal, Tending and Protection Operations

Trend Analysis Table 6 provides an overview of planned versus actual renewal, tending and protection activities for each five-year period from 1991 to 2006 on the Lake Nipigon Forest. The planned and actual values have been summarized for all forest units combined, and have been annualized for the reasons listed in the introduction. The sources of information for this table have been footnoted. Five-year summaries are available for all silvicultural activities except natural regeneration, and have been included in Table 6.

During the 1991-96 and 1996-2001 periods natural regeneration levels vary, but were significantly lower than planned (13% and 55% respectively). These low levels were primarily the result of the lower than planned harvest levels, but were also influenced by the site conditions that prevailed in the areas that were harvested. Areas harvested during the 1991-96 plan contained very little area that supported sufficient stocking following harvest, and very little area that could not be treated artificially. Strip cutting was lower than planned because of the lack of lowland areas harvested and the predominance of terrain too rough for strip cutting.

During the 1996-2001 period, natural regeneration levels were much lower than planned due to a number of factors, including:

- Considerably lower levels of harvesting in the hardwood dominated stands, as discussed previously and summarized in Table 4.
- A greater reliance on artificial regeneration methods, as evidenced with their over-achievement reported in Table 6, for this same period.
- Until very recently, the majority of area being treated for natural regeneration was generally reported the year following tree planting activities, which could be two or three years after the original harvest operations. Reporting in this manner eliminated the possibility of double counting of artificial and natural regeneration areas.

The standard practice to delay reporting of natural treatments affected the 1996-2001 results for the former Auden Forest specifically, where harvest activities occurred later than planned during the 5-year FMP period. A lack of harvest activity until the 1998-99 AWS resulted in corresponding delays in the start-up of silvicultural activities. The reporting of natural areas associated with these particular depletions was subsequently delayed until the 2001-06 FMP term, and explains in part why the level of achievement with natural regeneration (actual versus planned) is so much improved in 2001-06.

During the previous independent forest audit (2001), the auditors found that there were lapses in the database of mapped, harvested area that had not been tagged with silvicultural treatment information. These "missed" areas were generally in rough or wet ground areas that were not artificially treated (due to site conditions) and should have been recorded as natural regeneration. They had simply not been reconciled in the database. This observation led to Audit Suggestion #2: *Domtar should reconcile their depletion records and renewal records to ensure that all harvested areas are being properly tracked and regenerated.*

A multi-faceted action plan was developed for Domtar to:

(1) identify the areas in question;
(2) document silvicultural treatments and/or FTG results that had been completed;
(3) schedule outstanding silvicultural treatments and/or FTG assessments; and
(4) record all results appropriately in annual reports.

Commencing in 2002, Domtar began working progressively on these actions, and to date all backlog areas that had not been previously reported have been identified. This work was completed utilizing the GIS, through overlays of depletion records with renewal records. With the submission of the 2004-05 Annual Report, the majority of backlog area had been appropriately designated and reported. This also has contributed to the level of achievement (actual versus planned) being so much improved in the 2001-06 columns in Table 6. It is anticipated that all outstanding backlog will be cleaned up and reported in the 2005-06 Annual Report, prepared for the last year of plan implementation. The new requirement of the 2004 FMPM to report planned natural regeneration during the year of harvest will ensure that this issue will be avoided in the future.

2006 Independent Forest Audit
Table 6 - SUMMARY REPORT OF RENEWAL, TENDING AND PROTECTION OPERATIONS
MU: Lake Nipigon Forest and Auden Forest

	Area Summary of all Forest Units (ha)					
	1991-1996 [1]		1996-2001 [2]		2001-2006 [3]	
	Planned	Actual	Planned	Actual	Planned	Actual
Renewal						
Regeneration						
Uneven-Aged Management						
Selection Cut - Harvest						
Total Uneven-Aged Management						
Even-Aged Management						
Natural Regeneration						
Clearcut	2,791	475	2,360	1,442	3,021	3,301
Strip Cut/ CLAAG	833	5	831	322	922	575
Seed Tree Cut						
Uniform Shelterwood Seed Cut						
Subtotal Natural	3,624	479	3,191	1,764	3,943	3,876
Artificial Regeneration						
Planting	1,502	881	2,134	2,138	4,716	2,435
Seeding direct	800	279	414	578	77	22
with site preparation						
Scarification				33		
Subtotal Artificial	2,302	1,161	2,548	2,750	4,792	2,457
Total Even-Aged Management	5,925	1,640	5,739	4,514	8,735	6,332
Total Regeneration	5,925	1,640	5,739	4,514	8,735	6,332
Site Preparation						
Mechanical	2,200	1,075	2,425	2,741	4,473	2,341
Chemical	100	93	120	21	47	19
Prescribed Burn	502	75	130	6		
Total Site Preparation	2,802	1,243	2,675	2,768	4,519	2,360
Tending						
Cleaning						
manual		35	63	74	283	44
chemical - ground	180	55	0	134	495	212
- aerial	1,300	983	1,199	1,870	2,808	1,899
mechanical	10	10			0	
prescribed burn						
Spacing, pre-commercial thinning, improvement cutting						
even-aged			140	75	300	26
uneven-aged						
Cultivation						
Total Tending	1,490	1,082	1,402	2,154	3,886	2,182
Protection (Insect Pest Control)						
accelerated harvest						
salvage						
manual protection						
ground insecticide						
aerial insecticide	8,300	2,255				
Total Protection	8,300	2,255	0	0	0	0

1. Source: Table RPFO-7A for the Lake Nipigon Forest (for a 5-year period from 1991-96) and Table RPFO-7B for the Auden Forest (for a 6-year period from 1991-1997), contained in the Report of Past Forest Operations for the Lake Nipigon Forest 2001-2021 FMP.

2. Source: Tables RPFO-7 for the Lake Nipigon Forest (for a 5-year period from 1996-2001) and the Auden Forest (for a 4-year period from 1997-2001), contained in the Report of Past Forest Operations for the Lake Nipigon Forest 2006-11 FMP.

3. Source: Planned numbers are from Table FMP-25 for the Lake Nipigon Forest 2001-06 FMP, and include Amendments #'s 21, 22 23, 25 & 28. Actual numbers are from Table AR-7 from the Lake Nipigon Forest 2004-05 Annual Report, for the 4-year period from 2001-02 to 2004-05, plus preliminary 2005-06 area summaries, where available. (Natural Regeneration summaries are not available yet).

Note: All area summaries have been annualized in this table.

In summary, during the first four years of the 2001-06 FMP period, actual natural regeneration treatments have achieved 98% of planned. This is a result of the greatly improved achievement in actual versus

planned harvest levels in the hardwood dominated stands, reconciling much of the naturally treated areas of the 1996-2001 FMP term (the delayed reporting mentioned earlier), and cleaning up backlog areas from previous TMPs that had inadvertently been missed. As footnoted in Table 6, natural regeneration summaries for 2005-06 are not available at this time.

During the 1991-96 period, actual planted areas amounted to 59% of the planned level (78% achievement on the former Lake Nipigon Forest and 23% on the Auden Forest). This compares favourably with the actual harvest areas of softwood dominated stands, which amounted to only 55% of planned depletions. There was also a shortfall of silvicultural funding for the Auden Forest. During this TMP period, bareroot planting was 100% of the planned level, whereas, container planting was 47% of the planned level (based on # of trees). This was due to the fact that most sites were well suited to bareroot stock, and there was also a surplus of bareroot stock available at this time.

During the 1996-2001 period, actual planting levels exceeded the planned levels, which again compares rather favourably with the harvest depletions in the softwood dominated stands. This overachievement was due primarily to more ground being suitable for tree planting than was originally estimated in the FMP. Another reason was the conversion of a portion of the poplar and white birch working groups to conifer. When the original forecasts were made, it was felt that almost all of the Polar and Birch stands would be left for natural hardwood regeneration. However, because of excellent mixedwood site conditions in many of these stands, the decision was made to site prepare and plant, to maintain the mixedwood stand conditions. A number of areas were also planted without site preparation during this planning period. The use of bareroot stock was phased out during this term due to the poor quality of the stock being produced and the availability of larger better quality container stock.

Planting levels in the 2001-06 FMP period, as reported in Table 6, have amounted to only 52% of planned levels. The reasons for this shortfall are as follows:

- Harvest levels in softwood stands (excluding PFR) are 78% of planned levels;
- Wet pockets within upland conifer stands, generally bedrock controlled, have been treated as natural regeneration;
- Stands or portions of stands that contain a moist soil condition, generally on transitional ecosites, have not been suitable for artificial treatment, and were treated as natural regeneration.

Direct seeding achievements were lower than planned during the 1991-96 period due to lower than planned harvest levels (see Table 3 and 4 discussion) which resulted in less area being available that was suitable for aerial seeding. Conversely there was an overachievement of direct seeding during the 1996-2001 period due to the larger than planned amount of area which was appropriate for this treatment.

Seeding is normally used to regenerate jack pine stands growing on sandy to coarse loamy sites with low competition levels. The relatively low levels of planned seeding in the 2001-06 FMP (383 hectares over the 5-year term) corresponds with the low levels of allocations in the Jack Pine Conifer (PjC) forest unit. Total area actually seeded to date is lower than planned as a result of suitable sites.

The levels of achievement for total regeneration efforts (actual compared to FMP forecast) have increased dramatically since the 1991-96 period, at 79% in 1996-2001 and 72% in the 2001-06 plan. Recognizing that silvicultural activities normally lag behind harvest activities, spanning the last two years of the 1996-2001 FMP period, the level thus far in the 2001-06 FMP period is not of significant concern. The average annual area being regenerated (6,332 hectares) is fairly comparable with the average annual harvest depletion levels over the past two planning periods (5,013 and 7,485 hectares respectively, including regular plus salvage).

The mechanical site preparation program during the 1991-96 period was less than planned, approximating the depletion level. A variety of equipment was used during this period, including 3-Row Bracke, light barrels and chains, heavy barrels and chains, Young's Teeth, power trencher and tramping. The levels of achievement were higher on the former Lake Nipigon Forest (60%) than the former Auden Forest (30%). This was due to the 2-year delay in harvest activity on the Auden Forest, which resulted in a corresponding delay in site preparation. Chemical site preparation activities during this planning period

approximated planned levels with 465 hectares being treated versus a planned level of 500 hectares (which has been annualized to 100 and 93 hectares in Table 6).

A total of 2,509 hectares were planned to be prescribed burned during the 1991-96 FMP period (800 ha on the Lake Nipigon Unit and 1,709 ha on the Auden Unit). A total of 373 hectares were blackened, representing a 15% level of achievement. The one burn that did occur took place at Spool Lake on September 6 and 7, 1991 on the Lake Nipigon Forest. Another burn was planned for the planning period, however, the candidate sites identified in the 1991-96 TMP were either not harvested during the planning period or were harvested during the final year of the plan. No prescribed burns occurred on the former Auden Forest.

During the 1996-2001 FMP period, there was an overachievement of 13% in the mechanical site preparation program due primarily to slightly more ground being suitable for mechanical site preparation than originally planned. Another contributing factor was more area than planned being converted from the poplar and birch working groups to conifer (as discussed above). Most mechanical site preparation was completed with Bracke Mounders. Very little chemical site preparation occurred during the 1996-2001 period due to the lack of suitable site conditions for this treatment. No prescribed burns occurred during the 1996-2001 period due to a lack of MNR support, increased operational and potential suppression cost, unpredictability of results and the risk involved with this treatment.

Site preparation activities for the 2001-06 FMP have achieved 50% of planned levels. There are a few reasons contributing to this shortfall, including:

- The harvest activities are slightly lower than planned (approximately 80%);
- Wet pockets within upland conifer stands were not site prepared;
- Portions of stands that contain a moist soil condition, generally on transitional ecosites, were better suited to natural regeneration;
- The FMP forecasts were too aggressive, based on imperfect forest unit sorting criteria. The 1985 FRI from the former Auden Forest did not have the benefit of Domtar site types (Site Type "1" was used to delineate lowland spruce stands on the former Lake Nipigon Unit). The forest unit criteria used in the 2001-06 FMP, using FRI site classes to delineate upland from lowland spruce stands (SpC versus SpL), was not always accurate.

No high complexity prescribed burns were planned or carried out during the 2001-06 FMP term. To increase the available land base for regeneration and to reduce wildfire hazard, slash piling and pile burning was identified as an option in the plan, with details to be provided annually in the "Slash Pile Burning Plan . Most slash piling has been completed in conjunction with site preparation operations, utilizing the skidders on site. There has also been some more recent slash piling undertaken in winter harvest areas, using loaders. To date, a total of 363 hectares of roadside slash have been burned.

It is relevant to note that during the previous independent forest audit (2001), the auditors found that although Domtar's slash burning program was effective in most areas, there was room for improvement, especially in the winter harvest locations. This observation led to two audit recommendations:

Audit Recommendation #13: *Domtar should develop a comprehensive strategy to manage untreated winter roadside slash accumulations. This strategy should include:*

- *An assessment of the amount of productive forest area currently being lost to winter roadside piles.*
- *The development of techniques and operating procedures, to reduce all winter roadside slash accumulations.*

Audit Recommendation #14: *The OMNR should facilitate the disposal of slash piles, primarily through its annual review and approval of Domtar's slash pile burning plan.*

Domtar, in response to Recommendation #13, completed an assessment using aerial photography and the GIS system, and calculated an estimate of the amount of productive harvested area lost to winter roadside piles. They also investigated other techniques that have been used elsewhere (other Domtar

facilities, other industry partners, research organizations, etc.), through consultation and a literature search. The results of these efforts have been documented and are available at the Domtar forestry office in Red Rock.

The method currently being used (piling with a skidder and burning) has proven to be the most cost-effective method of slash disposal that meets the desired results. Piling with a loader has proven to be somewhat more effective in preparing fuel for a fire, due to increased pile heights, more air space and reduced non-flammable debris. It is however, much more expensive and where undertaken in winter harvest allocations, often inaccessible during the frost-free seasons (and unable to be burned). Nevertheless, even without the piles being burned, a significant portion of productive land can be recovered with this method, and slash accumulations can be reduced without excessive compaction or scraping of the underlying soil.

The MNR Nipigon District, together with Greenstone Fire Management Headquarters have worked directly with Domtar in processing and approving their slash pile burning plans. There have been issues with later than desired plan submissions (in the view of the MNR) and requirements that are (in the view of forest industry) much too stringent for low complexity burns.

Opportunities for streamlining and facilitating the slash pile burning programs were discussed at a "Red Tape Reduction" meeting held at the request of the MNR Nipigon District Manager in January, 2006, in response to Recommendation # 5 of the Minister's Council of Forest Sector Competitiveness. The following recommendations were documented in this regard:

- Fire management should have access to the FI Portal and NRVIS values system for the transfer of important information (e.g., values, photos, maps, and other GIS information).
- Industry should submit a single burn plan to fire management for approval.
- The requirements and approval process for a slash pile burn plan is currently very onerous, and should be relaxed for low complexity burns, that could take place later in the year.

Manual and ground tending on the Lake Nipigon Forest has normally been conducted in aerial spray buffer zones and other areas of specific concerns that if left untreated, would result in undesirable competing vegetation overtopping the regenerating conifer in these zones, with the resultant loss in the investment in the site preparation and planting of these areas. The areas of manual tending increased from 161 hectares in the 1991-96 planning period to 341 hectares during the 1996-2001 FMP period. There was actually an overachievement of manual tending compared to planned levels, due to this treatment being a more cost-effective option. It was generally found that smaller contractors were getting trained and entering into manual tending at competitive rates, which made this a much more viable option than in pervious plan periods.

Only 222 hectares were manually tended in the 2001-06 FMP, which was much less than planned. Similarly, chemical ground tending activities have increased steadily over three planning terms, although the actual levels in the 2001-06 term are significantly below planned levels. Domtar also implemented chemical ground tending in a number of very small areas of plantation which were too small to operationally treat as part of the regular aerial spray program.

Aerial tending during the 1991-96 planning period was 76% of the planned level, almost exclusively due to dramatically reduced efforts on the former Auden Forest at the time. These reductions were the consequence of fiscal constraints within the MNR, reduced silvicultural funding for the Unit and the delay in the start-up of site preparation and tree planting activities. During this planning term, the aerial spray program was successfully achieved on 94% of the planned areas on the former Lake Nipigon unit.

During the 1996-2001 period, there was a 56% overachievement in aerial tending. This overachievement corresponds with the high level of achievement in the planting program. The forecasts of aerial tending in Table 4.19 of the 1996-2001 FMP were based on the assumption that approximately 50 per cent of the artificially regenerated areas would require aerial tending. The artificial regeneration program (particularly container stock planting) ended up being considerably larger than planned, and therefore the aerial tending program needed to be expanded to ensure that these areas develop into the forecasted future

forest condition. The overachievement can also be related to the treatment of backlog older plantations that required release during this period.

Over the first four years of the 2001-06 FMP, aerial tending has been undertaken on approximately 62% of the planned areas. This relatively low level of achievement corresponds with low site preparation and planting levels to date, due primarily to different site conditions being encountered than planned.

Pre-commercial thinning (PCT) was undertaken for the first time during the 1996-2001 FMP period. A total of 700 hectares were identified as candidate areas, with approximately half (345 ha) of the planned level ultimately being thinned. Half of the planned PCT program was to be in spruce forest units, however, no spruce was treated during the period. Extensive areas of older jack pine seeding areas were assessed to determine their suitability for PCT. Many of the sites that were assessed ended up either being too patchy, in terms of the areas requiring thinning, or the sites were poor (shallow soils) making them unsuitable or uneconomical to undertake the treatment.

Thus far in the 2001-06 FMP period, very little pre-commercial thinning has taken place. A total of 1,500 hectares were planned as candidate sites, subject to field verification for suitability (1,000 hectares in 10-20 year old stands aerially seeded to jack pine, plus 500 hectares in 10-15 year old pure poplar stands). Field visits in the jack pine areas revealed lower densities or poorer sites than anticipated in most candidate areas, reducing the achievement levels significantly. No areas have been thinned in poplar stands.

Aerial pest control for spruce budworm was conducted during the 1986-1991 period and continued into the first year of the 1991-1996 period. The advanced stage of the spruce budworm infestation and the budgetary constraints in subsequent years of the plan resulted in no other areas being sprayed.

2.7 Harvested Area Successfully Regenerated – Summary of All Forest Units

Trend Analysis Table 7 is intended to provide a general indication of how much area is actually being successfully regenerated, relative to the area being harvested. It is recommended in Appendix C of the IFAPP to use a 10-year delay from the end of the audit period (2006) in harvest area reported, to address the time lag that occurs prior to the point when regeneration is likely to be assessed for success. Accordingly, harvest depletions from the 1991 to 1996 period have been used to complete the "Total Area Harvested" row in Table 7. The 1991-96 Report of Past Forest Operations documented that a total of 18,384 hectares were harvested during this period (10,852 hectares in the former Lake Nipigon Forest, plus 7,532 hectares in the former Auden Forest).

On the Lake Nipigon Forest, areas are normally assessed for FTG status five to seven years after treatment (planting/seeding) on artificially regenerated sites, and five to eleven years after harvest on naturally regenerated sites. Generally, planting/seeding occurs between one and three years after harvest.

The results currently presented in Table 7 are somewhat misleading, suggesting that only 7,635 hectares have been assessed. This area has been derived from areas reported in Table AR-14 of the 2004-05 annual report (4,110 ha), plus work undertaken during 2005-06 where complete information is available (3,525.7 ha). In fact, Free-to-Grow surveys were completed on an additional 1,882 hectares during the summer of 2005, but unfortunately the results have not been completely summarized at this time. This data will be completely summarized for the submission of the 2005-06 Annual Report due in November, 2006.

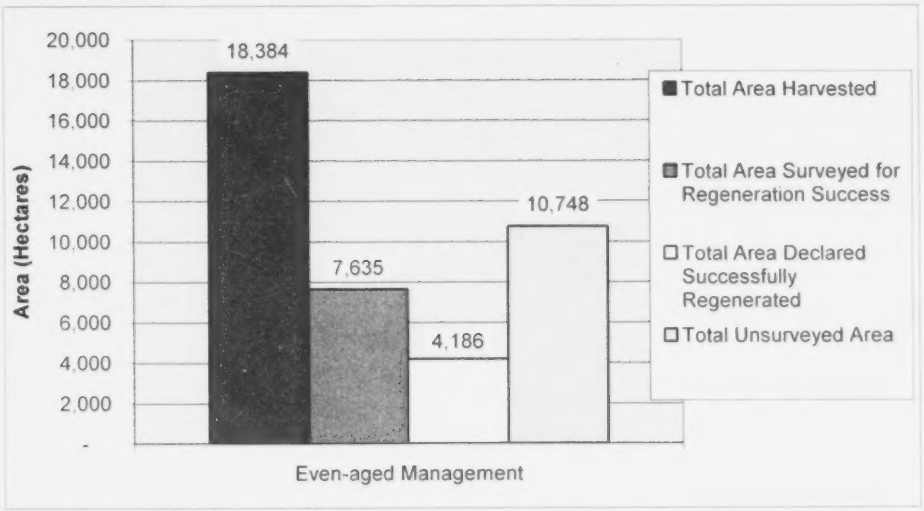
Of the total area surveyed for regeneration success, 4,186 hectares were declared FTG, representing an achievement of approximately 55%. The area surveyed but not Free-to-Grow (3,450 hectares) will be deemed NSR until such time when it meets the FTG criteria for height, stocking or free of competing vegetation.

A factor of 4% of the harvested area has been used to reflect the areas that have been lost as roads and landings. This is consistent with modeling done in the 2006-11 Lake Nipigon Forest FMP (as outlined in Part 2, Section 3.1.4 of the Analysis package, contained in Appendix AI of the FMP).

2006 Independent Forest Audit

Table 7- Harvested Area Successfully Regenerated
MU: Lake Nipigon Forest

	AREA IN HECTARES (All Forest Units Combined)
	Even-aged Management
Total Area Harvested	18,384
Total Area Surveyed for Regeneration Success	7,635
Total Unsurveyed Area	10,748
Total Area Declared Successfully Regenerated	4,186
Total Area Surveyed Not Successfully Regenerated	3,450
NSR	3,450
B&S	-
Not Available for Regeneration (eg. Roads & landings)	735
Other	-
Percent of Area Surveyed Declared Successfully Regenerated	54.8%



Source:
Total Harvest Area is from Tables RPFO-1 of the 1991-96 RPFO for the Lake Nipigon Forest.
Total Area Surveyed for Regeneration Success is from AR-14 for the 2004-05 Annual Report, plus available FTG results from 2005-06.

APPENDIX I

Summary of the Report of Past Forest Operations

(for the period from April 1, 1996 to March 31, 2001)

This summary of the draft report of past forest operations (RPFO) for the Lake Nipigon Forest was prepared by Domtar Inc., according to the "Phase-In" requirements of Appendix VIII, Section 2.3.2 of the Forest Management Planning Manual for Ontario's Crown Forests (FMPM). The complete version of the draft RPFO summarizes in text and table format, the actual operations, which were carried out on the Lake Nipigon Forest during the period April 1, 1996 to March 31, 2001. It also provides a text format description of operations in the current planning term up to March 31, 2003.

1.0 Highlights of Summary and Evaluation of Operations

Overall, during the Lake Nipigon Forest 1996-2001 FMP and Auden Forest 1997-2001 FMP period, harvest levels were slightly below (87% and 95% of the five and four-year FMP forecasts) planned harvest levels. Harvesting in the softwood forest units was 101% and 97% of the five and four year FMP forecasts, with harvesting in the hardwood forest units being 57% and 83% of the FMP forecast. Contributing factors to the low hardwood depletion levels included poorer quality of poplar from the Lake Nipigon and Auden Forests, haul distances to hardwood users, uncertainties in logistics associated with MNR poplar commitments, and the lack of poplar markets.

A total of 1,229258 m3 of softwood and 285,174 m3 of hardwood were utilized from the Lake Nipigon Forest during the 1996-2001 FMP period while a total of 536,486 m3 of softwood and 126,386 m3 of hardwood were utilized from the Auden Forest during the 1997-2001 FMP period. Softwood utilization was slightly below (76% and 86% of the FMP forecasts) planned utilization levels due to slightly lower than planned harvest depletion area achievement in the 1996-2016 and 1997-2001 FMP terms. Hardwood utilization was well below (35% and 56% of the FMP forecasts) planned utilization levels due to poorer quality of poplar from the Lake Nipigon and Auden Forests, haul distances to hardwood users, uncertainties in logistics associated with MNR poplar commitments, and the lack of poplar markets. Harvesting on the Lake Nipigon Forest during the 1996-2001 plan term was conducted primarily by Buchanan Forest Products Ltd. with smaller portion of the harvesting being completed by Red Rock Indian Band, Rocky Bay First Nation, and Weherhaueser / MacMillan Bloedel. Buchanan Forest Products Ltd. completed all of the harvesting on the Auden Forest for the 1997-2001 FMP term.

For the first two years of the 2001-2006 planning term, harvesting has been 38.6% of the total planned harvest for the five-year period. This is slightly below the expected level of depletion at this point in the planning term (i.e. 40% of the planned harvest area for the term).

Emerging issues with respect to harvesting on the Lake Nipigon Forest from the 1996-2001 FMP period and on the Auden Forest from the 1997-2001 FMP period as well as during the first two years of the Lake Nipigon 2001-2006 FMP period include:

- The relative amounts of "summer operating chance" and "winter operating chance" areas available for harvest. It is expected that this will also be an issue in the development of the 2006-2026 FMP.
- Lower than planned harvesting in hardwood forest units due to the uncertainty in hardwood markets and the distance of the northern extent of the Lake Nipigon Forest from the hardwood markets. An additional contributing factor is the low productivity (quality) of the white birch stands on the Lake Nipigon Forest.
- Harvesting in hardwood stands to utilize the conifer component, particularly during the early part of the 1996-2001 and 1997-2001 FMP terms. This occurred less frequently as hardwood markets improved. However, given the uncertainty of hardwood markets, this has been identified as a compliance concern during the 2001-2006 term.
- As operations continue in areas affected by the snow/wind storm of October 2001, it is expected that they will encounter difficulties, particularly with respect to economics, utilization, safety, and timing of salvage harvest operations. In addition, the storm presents challenges with respect to modeling the changes caused by the storm in areas where the storm was not a "stand replacing" event, in the preparation of the 2006-2026 FMP.
- Implementing the new 1995 ecosite based Forest Resource Inventory and the implications that it may have on forest management planning for the 2006-2026 FMP.

Renewal activities on the Lake Nipigon and Auden Forests during the 1996-2001 and 1997-2001 FMP periods approximated planned levels. A total of 13.3 million trees were planted on 7,902.3 hectares on the Lake Nipigon Forest during the 1996-2001 period (129% of the five-year FMP forecast) while 5.8 million trees were planted on 2,231.5 ha on the Auden Forest during the 1997-2001 period (49% of the four-year FMP forecast). A total of 2,584.3 hectares (129% of the 1996-2001 FMP forecast) of aerial seeding was conducted on the Lake Nipigon Forest with an addition 245.7 hectares (351% of the 1997-2001 FMP forecast) being completed on the Auden Forest. Mechanical site preparation was conducted on 6,992.0 hectares (91% of the five-year FMP forecast) on the Lake Nipigon Forest with an additional 77.4 hectares (15% of the five-year FMP forecast) of chemical site preparation. A total of 5,369.2 hectares (122% of the four-year FMP forecast) of mechanical site preparation was completed on the Auden Forest with 23.1 hectares (23% of the four-year FMP forecast) of chemical site preparation. A total of 23.0 hectares (9% of the four-year FMP forecast) also took place on the Auden Forest. Reported levels of natural regeneration were low on both the Lake Nipigon and Auden Forests during the five and four-year FMP terms. A total of 5,875.2 hectares (50% of the five-year FMP forecast) were reported on the Lake Nipigon Forest while 2,356.1 hectares (57% of the four-year FMP forecast) were reported on the Auden Forest. The level of natural regeneration was lower than planned primarily due to a lack of reporting these areas in annual reports.

Tending activities on the Lake Nipigon Forest during the 1996-2001 FMP period were above (160% of the five-year FMP forecast) planned levels due to the level of aerial tending that occurred on previously established plantations and the required for retreatment of selected areas. Manual tending was conducted on 219.3 hectares (110% of the five-year FMP forecast) and pre-commercial thinning was conducted on 223.9 hectares (45% of the five-year FMP forecast).

Tending activities on the Auden Forest during the 1997-2001 FMP period were above (139% of the four-year FMP forecast) planned levels due to the level of aerial tending that occurred on previously established plantations and the required for retreatment of selected areas. Manual tending was conducted on 121.6 hectares (105% of the four-year FMP forecast) and pre-commercial thinning was conducted on 122.1 hectares (61% of the four-year FMP forecast).

For the first two years of the 2001-2006 FMP term, renewal and tending levels have continued to approximate planned levels. However, no aerial seeding has been conducted to date since there were few suitable sites available and the very high levels of tree planting precluded aerial seeding.

Emerging issues with respect to renewal and tending on the Lake Nipigon Forest (1996-2001 FMP term) and the Auden Forest (1997-2001 FMP term) and the first two years of the 2001-2006 FMP period include:

- The low level of natural reporting during the 1996-2001 and 1997-2001 FMP periods. Reporting of natural regeneration was low prior to the 2001-2006 FMP term but are planned to increase in the 2001-2006 term to ensure that all harvest areas are accounted for in the annual reports

Approximately 46% and 72% of the forecast amount of regeneration assessment was conducted during the 1996-2001 and 1997-2001 FMP period for the Lake Nipigon and Auden Forests.

During the first two years of the 2001-2006 FMP term, approximately 33% of the FMP forecast has been assessed. Contributing factors to the lower than planned level include the adjustment in timing of assessments, the geographic distribution of assessment areas, and the effects of utilizing a new updated 1995 forest resource inventory for the 200-2026 FMP

Emerging issues with respect to regeneration assessments on the Lake Nipigon and Auden Forests 1996-2001 and 1997-2001 FMP periods and the first two years of the 2001-2006 FMP period include:

- The adjustment to the timing of regeneration assessments causing many areas that were scheduled for assessment in the early part of the 2001-2006 FMP term to have already been assessed in previous plan terms. By the start of the 2006-2011 FMP term, assessments should be according to the silvicultural ground rules and there should be little overlap with previous assessments.

- Since careful logging around advanced growth (CLAAG) is a relatively new treatment on the Lake Nipigon Forest, expected results have not been verified in the field. CLAAG surveys initiated in 1999-2000 will be used to verify expected results and provide an indication of the timing of future regeneration assessments. These surveys should continue in the future.

Road construction activities on the Lake Nipigon Forest were slightly below the levels forecast in the 1996-2016 FMP due to the lack of construction on some roads and the incomplete construction of other roads. A total of 6.3 kilometers (39% of the five-year FMP forecast) of primary road and 54.9 kilometers (53% of the five-year FMP forecast) of secondary road were constructed on the Lake Nipigon Forest during the 1996-2001 FMP period. Primary road construction activities on the Auden Forest were slightly above the levels forecasted in the 1997-2001 FMP with a total of 14.7 kilometers (110% of the four-year FMP forecast) being constructed. Secondary road construction activities on the Auden Forest were slightly below the level forecasted with a total of 41.7 kilometers (60% of the four-year FMP forecast) being constructed. Actual secondary road levels were lower than planned as a result of the lack of construction on some roads and the incomplete construction of other roads.

Road construction activities during the first two years of the 2001-2006 FMP term are on schedule. However, it is anticipated that not all of the secondary roads will be constructed as planned due to extremely rough terrain in the southern portion of the forest.

Emerging issues with respect to access on the Lake Nipigon Forest from the 1996-2001 FMP period and the Auden Forest from the 1997-2001 FMP period and the first two years of the 2001-2006 FMP period include:

- The issue of road abandonment and water crossing monitoring in areas were operations have been completed and may not return again for some time
- The continual task of primary and secondary road maintenance and water crossing monitoring in areas were harvesting operations are not actively occurring.

The compliance history on the Lake Nipigon Forest is best described as generally good, with most operations conducted by a well-trained and supervised workforce. However, past inspections and compliance audits have identified a number of concerns, particularly as operators start-up, including trespasses in unapproved areas, roadside utilization, lack of markets, water crossing installations, and lack of communication between over-lapping licensees, Domtar and MNR for notifications and approvals. Generally, identified compliance issues have been addressed in an expeditious manner. Therefore, it is anticipated that the compliance program will continue to follow the general direction as a Compliance Plan is developed for the 2006-2011 operating period.

2.0 Assessment of Forest Sustainability

All indicators of sustainability could not be assessed since the information is lacking in the Lake Nipigon Forest 1996-2016 FMP and Auden Forest 1997-2001 FMP which were prepared under the *Timber Management Planning Manual for Crown Lands in Ontario* (1985) and deemed Forest Management Plans (FMP). However, based on the information available, the Lake Nipigon Forest (post amalgamation) is being managed in a sustainable manner.

Specific information on two measurable indicators of forest sustainability were assessed for the Lake Nipigon and Auden Forests. Changes in managed crown forest available for timber production and the frequency and distribution of clearcut and wildfire sizes were analyzed for the 1996-2001 and 1997-2001 periods. As a result of revisions to forest unit definitions over successive plan terms and a reduction in the landbase due to the OLL initiative it difficult to derive forest structure trend information at the forest unit and age class level. However, some general issues can be noted:

- As the result of the budworm epidemic the majority of the balsam fir working group had succeeded to poorly stocked spruce, poplar, and white birch working groups. After harvest these areas have been treated with appropriate silvicultural treatments to move them back into a productive forest condition that would be less vulnerable to future budworm attack. The balsam fir forest units were allowed to decrease over time during the first two years of plan

implementation, this strategy has been implemented through silvicultural practices. This strategy should continue in the 2006-2026 FMP.

- To protect the genetic heritage of red pine and white pine on the Lake Nipigon Forest, encountered individual trees have been left standing with in harvest areas. These individual trees have been maintained on the site to act as seed trees to aid in the regeneration of red and white pine on the forest. This strategy has been implemented through the 1996-2001 and the first two years of the 2001-2006 FMP term and is expected to continue in the 2006-2026 FMP.
- The decreases in managed crown forest available for timber production as a result of OLL has had an impact on the available harvest area. This has had impacts on socio-economic objectives related to wood supply and employment in the forest industry.
- Prior to the 1996-2001 and 1997-2001 a large number of small disturbances were created on the Lake Nipigon and Auden Forests. However, during the 1996-2001 and 1997-2001 FMP periods, harvest disturbances began to increase in size due to the application of the *Interim Woodland Caribou Habitat Policy*. There is however, a large percentage of disturbance area in the 10,000+ size class. This was created by one major fire disturbance (Nipigon 12 Wildfire) in 1999 and a disturbance that is the result of a conglomeration of many clearcuts that have occurred over the past 20 years. Overall, in the 1996-2001 and 1997-2001 FMP periods, there was movement towards the emulation of natural disturbance frequency and size class. This movement continued in the 2001-2021 FMP with the application of the caribou mosaic. Through the application of the *Forest Management Guide for Natural Disturbance Pattern Emulation* (2001), this movement should continue in the 2006-2026 FMP. It should be noted that the analysis that was completed for this report was done using a spatial analysis tool that was created by Domtar Inc. for the preparation of the 2001-2006 FMP. In the absence of any MNR created tools Domtar Inc. created their own in order to implement the *Interim Direction – December 1999 for Defining a Clearcut*. Presently MNR has developed the Natural Disturbance Pattern Emulation Guide Toll (NDPEG Tool). During the preparation of the 2006-2026 FMP this spatial tool will be utilized to reanalyze the frequency distribution of disturbance size on the Lake Nipigon Forest. This tool will analyze the forest following the direction in the Natural Disturbance Pattern Emulation Guide which includes new parameters and requirements to defining a disturbance. The disturbance frequency and size planning for the Lake Nipigon Forest 2006-2026 FMP will be based on the results of the NDPEG Tool analysis completed during the preparation of the FMP.

3.0 Achievement of Management Objectives

Generally, progress has been made toward the attainment of all of the objectives identified in the Lake Nipigon Forest 1996-2016 FMP and the Auden Forest 1997-2001 FMP. The two FMP's outlined three main objectives: sustained yield, integrated resource management, and environmental protection. These objectives underwent some significant reworking during the development of the 2001-2021 FMP in order to meet the requirements of the *Forest Management Planning Manual for Ontario's Crown Forests* (FMPM). These objectives were divided into the four main categories outlined in the *Crown Forest Sustainability Act*, specifically forest diversity, social and economic matters, provision of forest cover, and silviculture. A total of 17 objectives were identified in the 2001-2021 FMP. It is expected that the objectives and strategies will be refined in the development of the 2006-2026 FMP.

Factors to consider during the development of the objectives and strategies for the 2005-2025 FMP include:

- An assessment of the forest units developed for the 2001-2021 FMP to determine the availability and applicability of growth and yield information developed for the regional standard forest units.
- An examination of the SFMM inputs with respect to reflecting the forest condition and forest processes (natural forest succession, disturbance regimes, growth and yield data). Consideration will be given to the blowdown/snow damage which has occurred on the northern portion of the Lake Nipigon Forest.
- Incorporating the new 1995 forest resources inventory, and updating it to account for depletions, free-to-grow assessments, errors in the inventory, and the blowdown/snow damage effects.
- The effectiveness of the renewal and tending program on the Lake Nipigon Forest.
- Further consideration of divergent access requirements and interests on the Lake Nipigon Forest.
- Refining the specific format of information presented at information centres and forums.

- The desire for local employment in the forest industry.
- Adequate consideration of native issues in forest management, including on-going consultation, invitations to participate in the Native Consultation Process and the refinement of the specific format of this consultation, seats on the planning team, and other avenues of soliciting input.
- The requirement for personal use timber and fuelwood in close proximity to the communities of Nipigon, Beardmore, and Jellicoe.
- The identification of shoreline reserve widths.
- The lack of critical fish habitat data.
- Refinements to the caribou mosaic as part of the adaptive management approach and potential changes to the mosaic resulting from salvage harvesting and blowdown/snow damage in caribou mosaic blocks.
- Consideration of the impacts of marten core deferrals on the available harvest area.
- The effectiveness of the compliance monitoring program on the Lake Nipigon Forest.
- The effects/effectiveness monitoring program on the Lake Nipigon Forest.
- The *Independent Forest Audit* results.

The objectives and strategies identified in the 1996-2016 FMP for the Lake Nipigon Forest and the 1997-2001 FMP for the Auden Forest and the associated updates and revisions developed for the 2001-2021 FMP will be assessed for their continued applicability in the 2006-2026 FMP. Objectives and strategies will be developed at the planning team level for incorporation into the 2006-2026 FMP.

4.0 Audit Recommendations and Suggestions

An independent forest audit of forest management on the Lake Nipigon Forest was conducted in September 2001, covering the period April 1st, 1996 to March 31st, 2001. As outlined in the audit report, the audit team was satisfied that forest management on the Lake Nipigon Forest was conducted in compliance with the requirements of the Crown Forest Sustainability Act, implementation manuals, the Sustainable Forest License, and the audit protocol. The audit report also indicates that, in the opinion of the audit team, the Lake Nipigon Forest is well managed by Domtar Inc. However, the audit report did identify 28 recommendations and 7 suggestions for improvements in forest management activities.

APPENDIX II

Evaluation of Progress on Implementation of the 2001-06 FMP

1.0 Synopsis of Operations

This section has been copied directly from the 2004-05 Annual Report for the Lake Nipigon Forest. All references (within this synopsis) pertain to other sections of that annual report.

During the four years (2001-2004) of the five-year term of the FMP (2001-2006), forest management activities on the Lake Nipigon Forest were influenced by salvage harvest operations. To date salvage operations have occurred in the Nipigon 12 Wildfire of 1999, damaged areas resulting from the snow and wind storm of October 2001, and the Nipigon 58 Wildfire of 2003. These salvage operations impacted harvest levels through the focusing of operations in salvage areas, both within the FMP allocations and salvage areas identified through amendment planning. Similarly, the salvage operations impacted the regeneration program with a focus on the salvage harvest areas resulting in additional levels of planting and site preparation.

As outlined in Section 2.3.1 Harvest, during 2004-2005, harvest levels matched the average annual forecast level in the 2001-2021 Forest Management Plan for the Lake Nipigon Forest. To date, harvest levels have accounted for 73% of the total forecast level in the 2001-2021 FMP. With one more year remaining in the 2001-2006 planning term, it is anticipated that harvest levels will closely approximate the total forecast level in the FMP for the Lake Nipigon Forest.

As outlined in Section 2.3.2 Utilization, during the implementation of the first four years of the 2001-2006 planning term, utilization levels have been lower than forecasted in the FMP. From year to year the levels have been lower for a number of reasons including timber harvested but only partially processed (i.e., not hauled to the mill) at the time of reporting, limited hardwood markets resulting in uncut volume, and substantial salvage operations in the Nipigon 12 Wildfire, the Blowdown/Snow Damage salvage blocks and Nipigon 58 wildfire.

Many of the renewal and tending activities reported in the 2004-2005 Annual Report for the Lake Nipigon Forest approximated the levels identified in the 2004-2005 AWS. Natural regeneration, tree plant, site preparation, and aerial seeding closely matched or surpassed the scheduled levels in the AWS. Tending levels were just slightly below the scheduled levels as discussed in section 2.3.5 Renewal, Tending, and Protection. To date, the reported level of natural regeneration have accounted for 88% of the forecast level in the 2001-2021 FMP and is anticipated to reach the total forecasted level by the end of the planning term. Site preparation and artificial regeneration levels to date have accounted for 49% of the forecast level in the FMP. It is anticipated that the forecasted levels for these treatments will not be reached primarily because of inconsistencies in the inventory and actual ground conditions. These inconsistencies have resulted in additional area being reported for natural regeneration. The low (55% of forecast) to date levels of reported tending are reflective of the lower levels of artificial regeneration levels discussed above. No pre-commercial thinning activities are reported in the 2004-2005 Annual Report. To date, reported levels have been low (9% of FMP forecasted) and are anticipated to remain low primarily because of a lack of suitable stands.

During the first three years of FMP implementation, assessment of regeneration success was relatively low. Furthermore, no regeneration assessments were conducted during 2004-2005 due to the limited aerial helicopter use for tending surveys. Considerable area has been scheduled for assessment in the 2005-2006 AWS by means of aerial and ground surveys.

A total of 4.3 kilometres of primary road construction occurred during the 2004-2005 period. The primary road construction consisted of the southern portion of the Blair Lake Road, it is anticipated that the remaining portion of the road will be constructed in the following year. The road was not fully constructed do to limited construction time during the 2004-2005 period.

A total of 5.8 kilometres of secondary road was constructed on the Forest for the 2004-2005 period. The secondary road construction consisted of the Hipel Lake Road and the Hainsworth Lake Road. The Hipel Lake Road has been completed while slightly more than two kilometres of the Hainsworth Lake Road remains uncompleted. The Hainsworth Lake Road has not been completed as a result of the rough

terrain and shallow soil conditions. The remained of the Hainsworth Lake Road has been scheduled for construction in the 2005-2006 AWS period.

A number of primary and secondary roads were maintained during the 2004-2005 AWS period. The maintenance consisted of regular grading and plowing but also included extensive emergency repair work that was primarily in response to the severe October rainstorm.

As outlined in Section 2.3.12 Community Needs and Socio-Economic Concerns, the Local Employment In Forest Management Activities strategies identified in the 2001-2021 FMP have been met as a result of a sizeable portion of the tree plant activities being conducted by local first nation contractors and a large portion of the harvesting, processing, road construction, and support activities being conducted by local community members and businesses.

As outlined in Section 2.3.13 Other Activities, a number of initiatives are being implemented on the Lake Nipigon Forest that contribute to Domtar's overall commitment to strive for leadership and continuous improvement in forest management.

2.0 Assessment of Objective Achievement

This section has been added to the Comparison and Trend Analysis Report, to document the progress towards achieving the management objectives developed for the 2001-06 FMP. As mentioned throughout the Comparison and Trend Analysis Report, not all information for the complete 5-year 2001-06 FMP period is available and some of the following assessment has been made on a subjective basis.

As mentioned in Appendix I, the objectives that were developed in earlier planning periods underwent significant changes in order to meet the new requirements of the *Forest Management Planning Manual for Ontario's Crown Forests* (FMPM). The objectives developed for the 2001-06 FMP were divided into four main categories, relating to the following:

(1) Forest Diversity;
(2) Social and Economic Matters;
(3) Provision of forest cover; and
(4) Silviculture.

A total of 17 objectives were identified in the 2001-2006 FMP.

2.1 Forest Diversity Objectives

"To maintain forest diversity within the bounds of natural variation."

The 2001-06 FMP planning team determined that forest diversity must be maintained in terms of forest age class structure and wildlife habitat unit trends through time. The measure of achievement for age class structure was to move forest unit areas to a sustainable target level, while maintaining a portion of area in older forest. Through analysis, it had been determined that the desired future forest condition for age class structure (the sustainable target level) would be reached in 100 years.

This determination was based on an analysis and comparison of different management alternatives, relative to a benchmark "Null" scenario which was established to assess how the Lake Nipigon Forest might develop naturally over time, in the absence of human intervention. The Null scenario was a projection where no harvest or fire suppression activities took place. In this manner, objectives and strategies could be reflected non-spatially in long term strategic modelling (using SFMM), following the new direction outlined in the CFSA to emulate natural disturbances and landscape patterns (within the bounds of silvicultural requirements). The reader is referred to Section 2.3.7 of the 2001-06 FMP for a more detailed discussion concerning management alternatives, the Null scenario and their representation in SFMM.

As discussed in Section 2.5 of this Trend Analysis report, the basic concept was that if the forest management activities (harvest, renewal and tending) closely followed the SFMM model results over time,

the current forest conditions should move toward the desired future forest conditions. Through the comparison and analysis of management alternatives (which is detailed in Section 2.3.8.2.3.1 of the 2001-06 FMP for this specific objective), it was determined that the Selected management Alternative had met the objective achievement standards for age class structure.

The two graphs presented earlier (Figures 8 and 10), portrayed some radical differences between 2001 and 2006 with respect to the current forest age structures, due primarily to the use of a different FRI. As mentioned previously, it is difficult at this time to determine if forest management activities over the 5-year timeframe have had any influence towards reaching the desired future forest conditions defined in the 2001-05 FMP.

Similarly, the SFMM model was used to monitor the distribution of wildlife habitat units through time. Habitat units are similar to forest units in that they represent aggregations of similar plants and trees that occupy similar site types, and depending on their seral stage (pre-sapling, sapling, mature, over-mature), are generally populated by a range of wildlife species. The relative change in habitat unit area over the 100-year period that was required to reach the desired future forest condition was therefore indicative of the change in diversity of wildlife that might be present on the forest. The planning team determined that the measure of objective achievement was to avoid any significant changes in the area of each of the 13 habitat units being monitored over time. In the analysis of future habitat supply, it was determined that all management alternatives satisfied the objective achievement standards for wildlife habitat unit trends and the Selected Management Alternative most closely emulated the trends of the Null scenario.

Habitat unit definitions and their associated sorting criteria within SFMM had changed significantly between the 2001 and 2006 plans. It is not possible to provide a direct comparison of current forest conditions for these two points in time, to assess whether forest management activities over the 5-year period have had any influence in this regard. In fact, during the preparation of the 2006-11 FMP, emphasis has shifted to using the distribution of forest unit groups to address forest diversity objectives, rather than using the distribution of habitat units.

"To protect and/or enhance landscape processes which affect the structure, composition and function of forest ecosystems through minimizing adverse effects on terrestrial and aquatic ecosystems."

The strategies for protecting/enhancing landscape processes involved consideration and incorporation of the following guidelines in the development of the 2001-06 FMP:

- *Forest Management Guidelines for the Protection of Fish Habitat*,
- *Forest Management Guidelines for the Protection of the Physical Environment*,
- *Code of Practice for Operations Within Riparian Areas*, and
- *Environmental Guidelines for Access Roads and Water Crossings*

As outlined in the FMP, the direction provided in the guidelines was considered and incorporated to prevent, minimize or mitigate adverse effects on the physical environment and maintain the productive capacity of managed sites.

Table FMP-6 from the 2006-11 Lake Nipigon Forest FMP has been included to highlight an aspect of landscape process that is addressed in one particular guideline. Water yield is directly affected by the amount of watershed area clearcut or burned within the past 10 years. Analysis enabled the 2006 planning team to determine the percentage of productive forest area disturbed within the past 10 years, in relationship to total productive forest area within second order watersheds – 10.6%. The Best Management Practices described in the *Forest Management Guidelines for the Protection of the Physical Environment* state that harvest areas within a five-year plan, plus past harvested areas not yet declared free-to-grow, should not exceed greater than 50% of a watershed area. The 10.6% level of achievement represents a fairly insignificant impact to these watersheds when measured collectively across the Forest.

FMP-6 Landscape Processes

Landscape Processes				
Net Primary Productivity (kg/ha/yr)		Water Yield (mm ha^{-1} day^{-1})		
Sub-Regional Value	% Change from previous plan	Total Productive Forest Area (km^2)	% Productive Forest Area Disturbed Within 10 yrs	% Change from previous plan
NW - 3 5716 NW - 4 4848	22.9% 18.2%	4,860.7	10.6%	20.5%

The area of second order watersheds disturbed in the period 1996-2006 has increased by approximately 20.5 % compared to the same measure in the 2001 FMP. This reflects the higher harvest levels since 1996, compared to those from the early 90's when operations were limited. The large Nipigon 12 Fire has also contributed significantly to this increase. Other influences to watershed disturbance have been the use of the new FRI and changes made to the second order watershed data.

Monitoring and reporting in accordance with the 5-Year Forest Compliance Plan (2001-2006) was listed as a second means to achieve this objective. A total of 528 forest operations compliance inspections were conducted during the four AWS periods from 2001-02 to 2004-05, with 379 conducted by forest industry and 149 by the MNR. These inspections were well distributed across the various activities (harvest, access, renewal and tending). It is apparent that there has been considerable movement towards attainment of this objective during the FMP period.

Domtar has recognized the need for continual improvement with respect to all aspects of operations, monitoring and reporting, and as recorded in annual reports, a number of initiatives took place over the 5-year term, including:

- Conducting Annual Work Schedule meetings with each over-lapping licensee and the MNR to discuss special site specific operation prescriptions outlined in the AWS, review environmental, safety, and forest legislative requirements, and discuss compliance issues.
- Communicating regularly with over-lapping licensees to ensure operating prescriptions are being conducted in accordance with the AWS.
- Conduct periodic Forest Operations Inspections on over-lapping licensee operations.
- Provision of additional information to over-lapping licensees related specifically to instances of non-compliance.
- Distribution of "Unidentified Stream Procedure for the Lake Nipigon Forest" laminated cards to overlapping licensees.
- Distribution of "Wildlife Trees in Harvest Cuts" laminated cards to overlapping licensees.
- Focus on and raise the awareness of erosion and sediment control mitigation techniques which may be applied to water crossing sites as well as the adjacent ditches and road approaches.
- Focus and awareness on sensitive sites and the application of the *Forest Management Guidelines for the Protection of the Physical Environment*.

In addition, Domtar has been contributing to a comprehensive initiative to monitor the impact of full-tree logging on Ecosite 12 (shallow-soil) stands over the 5-year term of the FMP. Results of this monitoring program have been regularly documented in annual reports.

2.2 Provision of Forest Cover Objectives

"To protect and maintain heron rookeries and nesting sites for bald/golden eagle and osprey."

This objective was developed to address vulnerable/threatened/endangered species values and operations in areas of concern for rookeries and nesting sites. During the preparation of the 2001-06 FMP, direction provided in the following guidelines were considered and incorporated:

- *Bald eagle and Golden eagle Habitat Management Guidelines;*
- *Management Guidelines and Recommendations for Osprey in Ontario;*
- *Management Guidelines for the Protection of Heronries in Ontario.*

All rookery and eagle/osprey nesting values which may be affected by forest management activities were identified and summarized on a "values map". This information was used to determine the affected Areas of Concern where the most appropriate prescription was subsequently enforced. Appropriate Area of Concern prescriptions were applied through the FMP amendment process, to any newly identified nest locations.

At the time of plan preparation, one Exception to Specific Direction or Recommendation in Implementation Manuals was approved by the MNR District Manager to allow harvesting, road construction and silvicultural activities to take place within 800 metres of a known osprey nesting site. In fact, no forest management activities took place in the "heavy development buffer zone" of any osprey nest, and thus the associated exceptions monitoring program was not triggered or required.

An additional strategy of the FMP was for the MNR to collect values information on the location of eagle/osprey nest sites and rookeries during plan implementation. Efforts have been taken through the term of the 2001-06 FMP with stick-nest surveys being undertaken. All new values were considered in the 2006-11 FMP.

Field inspections of nesting site and rookery AOCs occurred as part of the operations compliance program and results were included as part of the normal annual reporting requirements. One Non In Compliance incident was discovered, and reported in the FOIR system. This non-compliance involved a minor (5 hectare) trespass into a 800 m. no-cut zone of what was thought to be an eagle nest. Upon closer inspection, it was discovered to be an osprey nest. Although this non-compliance did result in an incursion into an AOC, it does indicate that the system is working, in that:

(1) The operations inspections are occurring;
(2) The non-compliance was reported promptly;
(3) The integrity of the value has not been damaged;
(4) The eagle nest designation was corrected to osprey nest; and
(5) The need for further training for new contractors was identified and carried out.

Based on the above information, this objective was met for known and newly identified nests.

"To ensure a suitable and sustainable landscape containing adequate year-round caribou habitat north of the caribou line."

No specific (quantifiable) target levels were identified in the 2001-06 FMP related to the provision of caribou habitat. Spatial habitat supply analysis conducted during plan preparation illustrated that an acceptable distribution of caribou habitat through time had been provided. This objective was deemed to be met at that time by following the direction provided in the *Forest Management Guidelines for the Conservation of Woodland Caribou: A Landscape Approach*. The reader should refer to Section 2.3.3.2.2.2 of the 2001-06 Lake Nipigon Forest FMP for a detailed summary of the following elements of this approach.

Key elements critical to the management of caribou habitat that were addressed as part of the strategies for this objective include:

a) Collection of Caribou Values Information

b) Stratification of the Forest into Habitat Management Zones.
c) Application of a long-term habitat mosaic on areas of relatively high importance for caribou.
d) Conducting a habitat supply analysis
e) Conducting harvest and renewal operations in a manner consistent with the silvicultural ground rules, with key consideration given to a future forest condition of similar habitat value for caribou.
f) Careful planning regarding road locations, standards and use management.
g) Applying an adaptive management approach whereby elements of the strategy are refined through time in response to future knowledge improvements and unpredictable natural disturbance.

In addition to the spatial habitat supply analysis, two forms of non-spatial habitat supply analysis were conducted. The first utilized the wildlife habitat suitability matrix in SFMM to identify the amount of preferred habitat that was projected to be available over time within the caribou zone. The supply for both winter and foraging habitat in the Selected Management Alternative was projected to be higher over time, than habitat projections for the Null scenario.

The second analysis involved the tracking of the amount of upland coniferous forest over 60 years of age in the conventional management zone. With the use of a caribou mosaic approach, there should theoretically be at least 40% of the area occupied by upland conifers, greater than 60 years old. The analysis demonstrated that this target was achieved. Results of both non-spatial analyses can be found in Appendix R of the 2001-06 FMP.

Comparisons between the 2001 and 2006 for the amount of preferred caribou habitat and/or the amount of upland coniferous forest over 60 years of age, have not been included. Results are not comparable due to the use of a different planning inventory based on new FRI, changes in the SFMM query for preferred caribou habitat and the significant changes to the caribou mosaic (as discussed below).

It is noteworthy that a number of concerns regarding caribou continued to be raised throughout the 5-year timeframe of the 2001-06 FMP. For example, only a limited amount of data is available regarding woodland caribou habitat and the presence of caribou on the northern portion of the Lake Nipigon Forest. As discussed in the 2006-11 FMP, some data collection did occur during the 2001-05 period regarding winter use and summer use calving lakes, however gaps in data still exist. FMP values funding during plan production covered limited value data collection and it appears that MNR funding for fish and wildlife data collection is only available during FMP production years. There are still a number of unknowns with respect to caribou activity on the Lake Nipigon Forest (i.e. the movement of caribou from Lake Nipigon to Onaman Lake).

A number of issues were also raised regarding caribou habitat management and the linkages to FMP planning activities pertaining to the following:

- Calving areas/important summer areas
- Wintering areas
- Travel corridors
- Road locations
- Road use management (existing and new roads)
- Utilization (of fibre)
- Renewal and tending
- Mosaic (details of managing caribou blocks) - Potential impacts to forest industry of maintaining a balanced geographic and temporal continuum of suitable caribou habitat across the forest.
- Inventory
- SFMM wood supply and habitat - Potential impacts to forest industry of maintaining a balanced geographic and temporal continuum of suitable caribou habitat across the forest.

The 2006-11 FMP planning team also received significant input from a variety of stakeholders (trappers, First Nation individuals, tourist operators, forest industry and the general public), who brought forward

their issues associated with the application of the caribou mosaic approach. The reader should refer to Section 2.3.3.2.2.2 of the 2006-11 Lake Nipigon Forest FMP for a detailed summary of the strategies that were developed to address the issues listed above.

Development of the mosaic for the 2006-11 FMP involved the evaluation of the 2001-06 FMP mosaic using a diverse set of information sources, including the new FRI and the caribou values map. Ultimately a number of changes were made to the mosaic used in the 2001-06 plan, driven by new sources of information and landscape (natural disturbances) changes, including the 2001 blowdown/snow damage, subsequent salvage harvesting, and new caribou values information.

"To maintain in suitable conditions, forest which has the capability to produce marten."

This objective was met by following the direction provided in the *Forest Management Guidelines for the Provision of Marten Habitat*. The strategies to meet the objective involved landscape and stand level components of the guidelines, as follows:

Landscape:

- Maintain 10-20% of the forest, which has the capacity to produce marten in suitable conditions.
- Suitable marten habitat should be arranged in "core habitat areas" between 30-50 sq. km. in size.
- A minimum of 75% of core habitat areas should be comprised of suitable conditions.
- Core areas should be connected by riparian reserves and other unharvested forest.

Stand:

- Harvesting practices will be modified to promote the retention of at least 6 live, dead or declining trees per hectare, with at least 2 of these exceeding 30 cm dbh.
- The requirements for snags, residuals and coarse woody debris across all harvest blocks will be reflected as part of the silvicultural ground rules.

During the preparation of the 2001-06 FMP, using the Ontario Marten Analyst (OMA) modeling tool, the total area of the Forest capable of producing marten habitat was calculated (803,773 hectares), which determined the 10-20% desired range that should be arranged as suitable habitat within cores. An iterative process was undertaken to explore a range of marten core areas (including a suite of cores providing the maximum potential habitat available), while assessing the associated wood supply impacts.

Ultimately, the planning team selected a series of cores projected in 20-year timeframes, out over 60 years. The amount of suitable habitat located within cores (as a % of capable habitat) was calculated to be 7.2% for 2001-21, 8.3% for 2021-41 and 8.7% from 2041-61. The planning team was unable to achieve the 10-20% target of suitable habitat within cores for the following reasons:

- The fragmented nature of the Lake Nipigon Forest.
- The age and nature of the FRI led to an underestimation of suitable habitat.
- Most cores that had been selected met the desired size class and suitability content and were reasonably distributed across the forest. Building any more cores would result in an inappropriate clustering of cores, having <75% suitability content in cores >5,000 hectares and forcing unacceptable impacts on other forest management plan objectives (especially wood supply).

A deferral file was generated with the OMA, which was subsequently input into SFMM. This allowed core areas to be made unavailable for harvest in SFMM for a 60-year period, thereby lowering the AHA for each forest unit as generated by the model. This provided a somewhat spatial emulation of the effect of retaining these specific marten cores on the landscape for this timeframe.

As an additional step, SFMM was used to monitor pine marten habitat through time from a non-spatial aspect, to assess whether the amount of preferred habitat was maintained within the bounds of natural variation. Based upon MNR Regional advice, the minimum acceptable levels should be no lower than 20% below the lowest point projected in the Null scenario. The results of the analysis were very favourable, and are presented in Section 2.3.8.2. of the 2001-06 FMP, as well as in Appendix S.

Area of Preferred Marten Habitat at 2001 (km^2)	Area of Preferred Marten Habitat at 2006 (km^2)	Percent Difference	Projected Area of Preferred Marten Habitat at 2101 (km^2)
3,065	3,001	-2.1%	2,597

The amount of preferred marten habitat at the start and end of the planning period has been listed in the table below. These results can be somewhat misleading, considering that a new FRI was used and minor changes were made to the SFMM query for preferred marten habitat. Nevertheless, it is apparent that there was little change in the amount of preferred habitat (-2.1%) over the past five years. The forecast area of preferred marten habitat at 2101 is actually much lower than existed in the current forest condition (in 2001). This future projection reflects the strategies to achieve a much different age class structure, by reducing the amount of older forest on the management unit and negatively affecting the unnatural amount of preferred marten habitat that exists today.

At the stand level, harvesting practices were modified to promote the retention of at least 6 live, dead or declining trees per hectare, and where possible, at least two of these exceeding 30 cm dbh. As outlined in the Forest Operations Inspection Reports, these stand level requirements were generally met. For the 2006-11 FMP period, a total of 25 well-spaced trees per hectare will be left on all sites, as per the *Forest Management Guide for Natural Disturbance Pattern Emulation*. These new strategies will hopefully eliminate any snag management problems related to the provision of marten habitat that have occurred over the past 5-year period.

"To ensure the quality of moose habitat is maintained or enhanced."

This objective was met during plan preparation by following direction provided in the *Forest Management Guidelines for the Emulation of Fire Disturbance Patterns - Analysis Results* and the *Forest Management Guidelines for the Provision of Moose Habitat*. The draft "fire emulation" guidelines (later replaced by the Forest Management Guide for Natural Disturbance Pattern Emulation) directed the planning team to design a range of clearcut sizes that over time would approach disturbance patterns similar to the site regional templates. This meant that the Moose guideline harvest block size of 130 hectares was exceeded in a number of cases in order to create the desired range of disturbance sizes in the Moose sub-unit (the area south of the "Caribou Line").

The need to provide moose habitat deferral (no-cut) areas, and links between important moose habitat values (aquatic feeding areas, calving areas , etc.) was considered in the selection of harvest stands and the configuration of allocation boundaries. The planning team tried to ensure that where likely early and late winter habitat was available, no harvest deferral areas were left between cut blocks and tried to provide scattered shelter patches within cutovers where edge of cover to edge of cover distance exceeds 400 m.

All moose habitat related values which may be affected by forest management activities were identified. This information was summarized, and Areas of Concern prescriptions were developed accordingly. These prescriptions were implemented and reported on as part of the compliance program in the Forest Operations Inspection Reports (FOIR).

As an additional step, similar to the assessment for future marten habitat, SFMM was also used to monitor moose habitat through time from a non-spatial aspect, to assess whether the amount of preferred habitat was maintained within the bounds of natural variation. Due to limitations with the wildlife suitability matrix in SFMM, "preferred" plus "marginal" habitat had to be used to represent moose foraging habitat. Based upon MNR Regional advice, the minimum acceptable levels should be no lower than 20% below the lowest point projected in the Null scenario. The results of the analysis were favourable, and are presented in Section 2.3.8.2. of the 2001-06 FMP.

The amount of preferred moose habitat at the start and end of the planning period has been listed in the table below. An assessment of changes in preferred winter habitat between 2001 and 2006 is essentially meaningless, with an increase of 419%. This is due to changes in the SFMM wildlife habitat matrix and

use of the new FRI. Nevertheless, since late winter habitat is often the limiting habitat feature for moose, a high amount of late winter habitat is positive for moose on the Lake Nipigon Forest. The slight change of foraging habitat between 2001 and 2006 seems much more reasonable, likely due to the much broader criteria used to distinguish "preferred" plus "marginal" habitat.

Type of Moose Habitat	Area of Preferred or Marginal Moose Habitat at 2001 (km^2)	Area of Preferred Moose Habitat at 2006 (km^2)	Percent Difference	Projected Area of Preferred Moose Habitat at 2101 (km^2)
Foraging	3,126	3,174	1.5%	2,850
Winter	773	4,014	419%	788

As a final strategy, the inventory of moose related values on the Lake Nipigon Forest was updated by the MNR during the 2001-06 plan term and in preparation for the 2006 FMP.

"To ensure the protection and maintenance of water quality and habitat for fisheries resources within watersheds where forest management activities occur."

This objective was met by incorporating direction provided in the *Timber Management Guidelines for the Protection of Fish Habitat*. During the production of the 2001-06 FMP, fish habitat and water quality related values were identified and protected with AOC prescriptions. These prescriptions were implemented through the FMP period and reported on in the FOIRs, as part of the compliance program for the Lake Nipigon Forest.

2.3 Social and Economic Matters

"To ensure that the Forest is managed in an environmentally sound manner to provide sustainable, economical, and predictable supply of quality wood fibre to user mills sourcing fibre from the Forest."

On an annualized basis over the 4-year term of the FMP for which information is available, and as discussed earlier in this report, actual areas harvested equated to an 80.2% level of achievement compared to planned depletions. This comparison included areas identified for salvage harvest through amendment planning, plus regular harvest areas. While all the planned FMP regular harvest allocations were not depleted, a comparable area was harvested in salvage allocations and the reduction in planned regular areas was expected and reasonable.

On a non-annualized basis, as reported in the 2004-05 Annual Report, 72.5% of planned regular and 41.5% of planned salvage areas had been harvested compared to the total FMP planned areas, including salvage amendments. In general, up to that time, higher levels had been harvested in upland stands, and especially so with the salvage efforts. During the last year of the plan, increased efforts were focused on more low ground sites, or upland forest units requiring winter access. Without the benefit of final depletion summaries for the entire 5-year period, it is difficult to comment with certainty about objective achievement in this regard. However, from an area perspective, it appears that an acceptable level was reached, considering the additional salvage areas that were harvested.

Total utilization from planned FMP allocations (including salvage amendments) was also below forecast after four years, with a 67% level of achievement on a annualized basis, for all species. As evident in Figure 1 in Section 2.3 of this report, there was actually an over achievement (105.5%) in salvage volumes, compared to a 59.2% level for regular harvest volumes. A number of contributing factors have influenced the lower than planned volumes over the first four years of the plan, and have also been discussed in Section 2.3.

"To achieve participation by local Native communities in the benefits provided through forest management planning and activities".

This objective can be broken down into two parts: (1) participation gained through consultation, and (2) benefits provided through economic development. As part of the Forest Management Native Consultation Program, an option was provided for First Nation communities within or adjacent to the Lake Nipigon Forest to choose additional consultation and documentation opportunities that are separate from the public consultation process. The Red Rock Indian Band, Biinjitiwaabik Zaaging Anishinaabek, Animbiigoo Zaagi'igan Anishinaabek (formerly the Lake Nipigon Ojibway First Nation) and Pays Plat First Nation chose to participate in the formal Native Consultation Program.

In addition to the formal opportunities, a series of other meetings and discussions took place with Red Rock Indian Band, Biinjitiwaabik Zaaging Anishinaabek and Animbiigoo Zaagi'igan Anishinaabek to discuss such topics as increased economic development opportunities in harvesting (more conifer harvest volumes) and silviculture, trapping, subsistenence hunting, and access restrictions. These meetings ranged from discussions with individual people, to chief and council, to open community meetings and information sessions, and resulted in gaining a better understanding of each others issues and concerns. A summary of the Native consultation process is presented in Appendix D of the 2001-06 FMP, and a summary of issues is provided in Section 2.3.2.3.2.

As a result of these discussions, a primary strategy to meet this objective was developed. Direct economic development opportunities would be provided for local employment of first nation community members in forest management related activities, in consideration of current capacity, past track record, economic development plans and local first nation community member involvement. Through further discussions, more detailed strategies were developed for the individual First Nations of the Lake Nipigon Forest.

It was determined that the same harvest volumes from the 1996-2001 FMP for the existing overlapping first nation licensees (namely Red Rock Indian Band and Biinjitiwaabik Zaaging Anishinaabek) should be maintained. Additional volume associated with the amalgamation of the Lake Nipigon Forest (approximately 38,500 m3/yr conifer), was equally divided amongst the three First Nations. This resulted in the Red Rock Indian Band and Biinjitiwaabik Zaaging Anishinaabik conifer volumes increasing, and Animbiigoo Zaagi'igan Anishinaabek becoming a new overlapping licensee on the Forest.

It is worth noting that Animbiigoo Zaagi'igan Anishinaabek and Red Rock Indian Band participated actively on the Nipigon East Area Local Citizen Committee over the 2001-06 FMP term. Five First Nations (including Red Rock Indian Band, Animbiigoo Zaagi'igan Anishinaabek, Biinjitiwaabik Zaaging Anishinaabek, Sand Point First Nation and Pays Plat First Nation), and one Native community (Poplar Point Ojibway), participated on the 2006-11 FMP planning team.

Red Rock Indian Band

The planned harvest volumes for the Red Rock Indian Band, who had conducted harvesting on the SFL during previous FMP terms, increased to approximately 46,050 m^3/yr conifer and 23,750 m^3/yr hardwood. As reported in Table AR-4 of the 2004-05 Annual Report, after four complete years of operation, the Red Rock Indian Band has averaged 43,140 m^3/yr conifer and 21,290 m^3/yr hardwood. In total, this represents a 92.3% level of achievement, relative to their planned annual utilization.

Over this timeframe, Red Rock Indian Band's harvesting operations employed between 19-31 local residents in their road construction, harvesting, processing and hauling operations through direct employment and their contractors. Early in the FMP period, up to 25 people were directly employed on a full-time basis by the Band's primary contractor - 4 K's Logging. In addition, 4 K's Logging provided employment for as many as 12 sub-contractors at one point during the 4-year period. In addition to the full-time employment, a number of short and temporary positions were also created as a direct result of 4 K's Logging operations. The Red Rock Band began directing their own logging operation under a numbered corporation in 2004-05 the AWS. 4K's Logging shifted to the Buchanan Forest Products Ltd. and Domtar (White River) licenses as a sub-contractor on the Lake Nipigon Forest at that time.

The Red Rock Indian Band had also undertaken silvicultural work such as tree planting on the Lake Nipigon Forest during previous planning terms. The Band was not involved in the tree planting program

during the first year of the plan. However, starting in the 2002-03 AWS, they planted 80,000 trees (2.5% of the total program) and have progressively increased their involvement since that time with 260,952 trees planted in 2004-05 (8.3% of the total program).

Biinjitiwaabik Zaaging Anishinaabek

The Biinjitiwaabik Zaaging Anishinaabek has also conducted harvesting on the Lake Nipigon Forest during previous planning terms and their planned harvest volumes increased to approximately 42,690 m^3/yr conifer and 16,170 m^3/yr hardwood. As reported in Table AR-4 of the 2004-05 Annual Report, after four complete years of operation, the Biinjitiwaabik Zaaging Anishinaabek has averaged 25,945 m^3/yr conifer and 6,930 m^3/yr hardwood. In total, this represents a 55.9% level of achievement, relative to their planned utilization.

All of the harvesting work conducted by Biinjitiwaabik Zaaging Anishinaabek was done through subcontractors, (Thunder Bay based contractor in 2001-02 and Sturgeon Timber Limited based in Dorion since that time). Over the 4-year period for which information is available, there were between 24-34 part and full time positions created by the harvesting operations for local employment. All persons employed were from Red Rock, Nipigon, Dorion, Hurkett, Rocky Bay, Pass Lake, Mac Diarmid or Thunder Bay.

The Biinjitiwaabik Zaaging Anishinaabek has previously undertaken other silvicultural work such as tree planting, site preparation, manual tending, pre-commercial thinning and cone collection on the management unit.

Over the 4-year (2001-2005) period, contractors working on behalf of this First Nation community (Amik Forest Renewal Limited, Charles Hardy) planted variable numbers of trees each year from 246,623 trees (6.0% of the total program) in 2001 to 110,140 trees in 2005 (3.5% of the total program). Amik Forest Renewal Limited was involved in other silvicultural programs during this timeframe including manual tending, mechanical site preparation and pre-commercial thinning.

Animbiigoo Zaagi'igan Anishinaabek

With the implementation of the 2001-06 FMP, Animbiigoo Zaagi'igan Anishinaabek became a new overlapping licensee on the management unit with planned volumes of approximately 13,060 m^3/yr conifer and 1,475 m^3/yr hardwood. This First Nation was also offered an opportunity for a harvest operation under direct contract with Buchanan Forest Products Ltd. In fact, Animbiigoo Zaagi'igan Anishinaabek has averaged 47,225 m^3 conifer annually, as well as 8,325 m^3/yr hardwood, dramatically exceeding their planned levels. This over-achievement (extra volume) was due primarily to salvage harvesting opportunities provided to the First Nation, and allowed this local operation to continue over the entire 5-year period. Over the planning period, Animbiigoo Zaagi'igan Anishinaabek's harvesting operations provided full-time employment to between 13-15 local residents through their contractor Lake Nipigon Forest Products.

Animbiigoo Zaagi'igan Anishinaabek had undertaken silvicultural work such as tree planting, site preparation and manual tending on the Lake Nipigon Forest during the previous five-year planning term, and during preparation of the 2001-06 FMP. The Band was involved in other silvicultural programs during this timeframe including tree planting, mechanical site preparation, manual tending and pre-commercial thinning.

As outlined previously in the Synopsis of Operations, the "Local Employment" strategies identified in the 2001-06 FMP have been deemed to be met due to sizeable portion of the tree plant activities conducted by local First Nation contractors and a large portion of the harvesting, processing, road construction, and support activities being conducted by local community members and businesses.

"To Maintain and protect Native cultural heritage values."

The identification and protection of native values was conducted through the 2001-06 FMP planning process with Area of Concern prescriptions being prepared for all identified Native values in or adjacent to

planned allocations. A Report on the Protection of Identified Native Values was prepared by Domtar for each community, with the assistance of First Nation representatives on the planning team. As an additional strategy, the MNR also undertook an assessment of High Potential Cultural and Heritage (HPCH) values within the selected allocations. Specific Area of Concern prescriptions were also prepared for these values.

"To maintain and protect archaeological sites, cultural landscapes and traditional use sites (non-Native)."

All known cultural heritage sites were protected with appropriate Area of Concern prescriptions. The assessment of High Potential Cultural and Heritage values within the selected allocations (mentioned above) included both Native and non-Native sites. Specific Area of Concern prescriptions were also prepared for these potential values. As no unknown cultural values were discovered during the implementation of the plan, the objective was essentially met during the FMP planning stage.

"To encourage opportunities for local employment in a range of forest management related activities (harvest, renewal, maintenance, log hauling, road construction, processing at local mills, etc.) as well as in the service and supply sectors which support these activities."

This objective was met on a strategic level during plan preparation, with the choosing of the Selected Management Alternative. A sustainable wood supply was provided through the selected management alternative, which also contributed toward local employment, and the continued employment in the manufacture of wood products in Thunder Bay, Nipigon, Red Rock, White River, Longlac and Terrace Bay.

In reality, throughout the 5-year term of the FMP, forest management activities on the Lake Nipigon Forest provided a wide range of employment opportunities for residents of local communities. This objective was met through the following opportunities:

- Direct employment opportunities in harvesting, renewal and tending operations with First Nation overlapping licensees mentioned previously.
- As the primary overlapping licensee on the unit, Buchanan Forest Products employed a large number of local residents in its road construction, harvesting, processing and hauling operations at their Jellicoe division. Between 30-50% of the Jellicoe Division workforce (approximately 125-140 people) is from the communities of Jellicoe, Beardmore, Geraldton, Nipigon and Red Rock. A large percentage is also from surrounding larger communities such as Thunder Bay and Longlac.
- Beardmore Forest Products Ltd., a community-based subcontractor, operated during the 2001-06 term as an overlapping licensee and also as a contractor under Buchanan Forest Products Ltd. Beardmore Forest Products Ltd. derived approximately 75% of its workforce from local communities.
- Owner-operator agreements with local residents in the harvesting and processing phases of harvest operations.
- Throughout the FMP term, a significant portion of silvicultural activities (stock production, tree plant, site preparation, tending, pre-commercial thinning, cone collection, and silvicultural surveys) were conducted by local silvicultural entrepreneurs. Silvicultural projects that did not contain significant local involvement were those projects that required specialized equipment, such as aerial seeding, aerial tending and slash pile burning.
- Domtar Inc., Buchanan Forest Products Ltd., and other overlapping licensees continued to utilize local suppliers and services in the supply and service sector of the local economy, including motel and restaurant services, groceries, fuel and propane purchase, office rental, and aircraft rental.

"To ensure that forest management activities are planned and implemented in a manner in which opportunities for commercial tourism activities can be sustained."

"To ensure that forest management activities are planned and implemented in a manner in which Crown land recreation opportunities (i.e. hunting, fishing, canoeing, camping, etc.) can be sustained."

"To ensure that forest management activities are planned and implemented in a manner in which opportunities for other commercial Crown land users (i.e. trapping, mineral exploration, baitfishing, etc.) can be sustained."

These objectives were met through public consultation and the implementation of specific AOC prescriptions. The AOC prescriptions associated with remote tourism, road-based tourism, crown land recreation, and road-based recreation are inspected as part of the compliance program.

During the 2001-06 FMP period, on-going communication with the tourism operators occurred through a variety of means (mailouts, planning team meetings, LCC meetings, and direct communication and discussions with individual operators). Communications also occurred as a result of the implementation of tourism related Area of Concern prescriptions. During the preparation of the 2006-11 FMP, negotiations towards the development of Resource Stewardship Agreements (RSAs) were undertaken, however none have been signed to date.

"To provide volumes of timber for such uses as fuelwood, building logs and other local or personal uses."

To address the demand for fuelwood, a number of stands were identified as fuelwood areas through the 5-year FMP period. There have been no issues in meeting the demand for personal use timber. After four years, a total of 2,064 m^3 of fuelwood was utilized for personal and commercial means.

One strategy developed in the plan was for Domtar to encourage local community innovation in the development of new and personal small commercial enterprises using unmerchantible fibre. During the term of the plan, Biinjitiwaabik Zaaging Anishinaabek submitted business plans for a small sawmill and a commercial fuelwood facility based on a 25,000 m3 conditional commitment of white birch from the Lake Nipigon Forest. MNR issued a facility licence under the CFSA in 2004/05. To date, as reported in Table AR-4 in the 2004-05 Annual Report, this mill has utilized 325 m3 cedar and 217 m3 of white birch.

2.4 Silviculture

"To optimize forest renewal and tending and maintain/enhance the long-term productivity of the forest in an environmentally sound manner."

The renewal, tending and protection program is essentially a combination of efforts (the silvicultural strategies), that were developed to in order to achieve many other management objectives, while moving towards the desired future forest condition. This objective reflects the broad goal of forest management in achieving a healthy forest ecosystem (which is reached if the desired conditions are met).

This objective was satisfied at the strategic level (using the SFMM model), through the analysis and ultimate designation of the Selected Management Alternative. The silvicultural strategies involved the classification of the forest into forest units, based on different tree species and site conditions, to most appropriately describe the current forest condition. The forest development information (yield curves) and silvicultural ground rules were developed to help guide the management of the forest from its current condition into the future, under the constraints of the inter-related SFMM modeling assumptions (operability ranges, natural disturbance cycles and succession, post-harvest succession, funding limitations, etc.). An appropriate balance of treatments (extensive, basic, intensive) was reached with the Selected Management Alternative.

The comparison between planned and actual levels of renewal activities has been previously discussed in Section 2.6 of this report. In summary, during the first four years of the 2001-06 FMP period, total regeneration efforts on an annualized basis are approximating 72% of forecast levels. Recognizing that silvicultural activities normally lag behind harvest activities, spanning the last two years of the 1996-2001 FMP period, the level thus far in the 2001-06 FMP period is not of significant concern. The average annual area being regenerated (6,259 hectares) is fairly comparable with the average annual harvest depletion levels over the past two planning periods (5,013 and 7,485 hectares respectively).

Site preparation activities over the first four years of the 2001-06 FMP have achieved 60% of planned levels due to harvest being lower than planned, wet site conditions, or sites being better suited to natural regeneration. Upon review, the 2001-06 FMP forecasts for site preparation were found to be too aggressive. Although there are still some issues regarding the accumulation of slash pile debris (and associated loss of productive land), as discussed previously in this report, both Domtar and the MNR have taken steps to address two recommendations from the previous independent forest audit in this regard.

Over the first four years of the 2001-06 FMP, aerial tending has been undertaken on approximately 62% of the planned areas. This relatively low level of achievement corresponds with low site preparation and planting levels to date.

In reviewing the "To Date" information reported in Table AR-11 – *Annual Report of Revenues and Expenditures* from the 2004-05 Annual Report, it is evident that the total Crown revenues after four years ($6,791,593) were significantly less than the forecast level ($17,743,100 for the 5-year FMP timeframe). Annualized, this represented a 47.8% level of achievement. This was due to the reduced harvest volumes compared to planned, a different mix of species and product types than planned, and the increased proportions of salvage harvest (with corresponding reductions in Crown revenues).

Similarly, revenues into the Forest Renewal Trust Fund were also much lower than planned, representing a 34.0% level of achievement when annualized. This was due to the same reasons, plus a lower renewal rate was being collected to allow for a netting down of the surplus in the Renewal Trust Fund. At the end of the 2004-05 season, a total of $4,521,034 had been directed into the Forest Renewal Trust Fund, while a total of $7,642,760 had been expensed. Although this discrepancy must (and is) monitored on an ongoing basis, it is not of undue concern at this time considering that the entire 5-year data had not been included, and the Fund was being maintained at levels well above the minimum balance. With respect to the Forestry Futures Trust Fund, the revenues to date were 93.4% of planned dollars, with total expenditures amounting to 75.2% of revenues.

2.5 Conclusion

It is not possible at this time to make final conclusions regarding objective achievement without the benefit of the entire 5-year annual report information. However, most objectives appear to be following an acceptable path. Objectives related to forest diversity and the provision of forest cover tend to be addressed during strategic modeling and/or through operational planning.

The shortfalls in harvest levels (in both area and volume) are explainable, and have not caused undue problems to the designated receiving mills. As mentioned earlier, logistics and market conditions often control the final destinations of deliveries to the larger, more established mills. Objectives pertaining to the protection of values or needs of specific interests (tourism, trapping, fishing, hunting, exploration, other outdoor recreation, etc.) were addressed by Area of Concern prescriptions and road use strategies.

Forest management planning by its cyclical nature, demands (among other things) ongoing review on a regular basis, in a consultative fashion. Improvements are incorporated as new plans are prepared subject to updates to the inventory, public and private input, new science and direction from a variety of sources. The 2006-11 FMP planning team has recognized and addressed a number of areas for improvement, most notably with the use of the 1995 FRI, the Resource Stewardship Agreement process with tourism, adjustments to the Woodland Caribou mosaic strategy, and adherence to the *Natural Disturbance Pattern Emulation Guideline and associated spatial analysis*.

3.0 Assessment of Forest Sustainability

The Crown Forest Sustainability Act (CFSA) states that "indicators" within appropriate criteria are to be measured to assess sustainability. The 1996 FMPM detailed that five forest sustainability criteria in particular, were to be considered in the assessment following the implementation of operations. These are summarized in Figure C-1 (Section 4.3 in the 1996 FMPM), and include:

- Biodiversity
- Forest Condition and Ecosystem Productivity
- Multiple Benefits to Society
- Soil and Water Conservation
- Accepting Society's Responsibility for Sustainable Development

Measurable indicators pertaining to each criterion were used predicatively during the preparation of the 2001-06 FMP, in helping to describe the current forest condition and in the analysis of management alternatives. The indicators that were used in a predictive fashion, and were intended to be monitored over time and reported in Report of Past Forest Operations tables include:

- Managed Crown Forest Area Available for Timber Production
- Landscape Pattern or Forest Diversity Indices
- Habitat for Selected Wildlife Species
- Percent of Available Harvest Area which is Actually Utilized
- Frequency Distribution of Clearcut and Wildfire Sizes.

The requirements to assess forest sustainability have evolved somewhat since the 2001-06 FMP was prepared with the implementation of the 2004 FMPM. The determination of sustainability and the development of objectives and strategies have become much more seamless, with a redefined list of indicators, especially with the assessment that is to occur following the implementation of operations.

Nevertheless, although complete information for the 2001-06 FMP term is not yet available, some indicators were assessed during the preparation of the plan as part of the analysis of management alternatives. The 2006-11 FMP was also prepared following the direction of the 1996 FMPM, and some of the measurable indicators listed above were used in both planning periods. The following is a brief summary of each forest sustainability indicator.

Managed Crown Forest Area Available for Timber Production

In providing for multiple benefits from the Lake Nipigon Forest, timber harvesting must not be allowed to exceed the long-term production capability of the resource base. At the same time, the area of managed Crown forest available for timber production, in the context of sustainability, should be maximized. As presented in Table 1 of this Trend Analysis report, the Crown Managed Forest Area has remained relatively stable over the 5-year period from 2001 to 2006 and in fact, has varied less than 5% since 1991. As an indicator of sustainability, this trend is acceptable. However, it is worth noting that a significant net loss of "available" Crown forest (-15.2%) is projected to occur, coincident with achieving the Desired Future Forest Conditions calculated in the 2006-11 FMP. This very significant projected loss reflects the accumulating effect of increased no-cut zones (NDPEG peninsulas) and/or Area of Concern reserves being applied (varying from 6% to 27% among the different forest units).

Landscape pattern

As forest operations and other natural events occur over time, the landscape and diversity indices will change. The sustainability of operations can be partially assessed by calculating these same indices on the forest at the start and end of a planning term. Unfortunately, as depletion information is not yet available for the entire 2001-06 timeframe, it is not possible to make a definitive comparison at this time. However, a second set of landscape pattern analysis was undertaken during the preparation of the 2001-06 FMP, following the selection of harvest areas. The analysis assumed the depletion of all of the 2001-06 harvest blocks and focused on the change in specific landscape pattern indicators as a result of this depletion. The analysis, based on FRI data, has been described in detail in Section 2.3.9.2.1 of the plan, with numerical results reported in Table FMP-13a. The conclusion was that all landscape pattern indicators provided predictable results that maintained forest diversity and ensured that current biological diversity of the forest was not significantly changing. Thus, it is felt that the landscape pattern created by the 5-year planned harvest operations make positive contributions to the sustainability of the Lake Nipigon Forest.

During the preparation of the 2001-06 and 2006-11 FMPs, landscape pattern indices were also generated from spatial analysis at various landscape levels (provincial, regional, sub-regional and management unit scales), based on classified satellite imagery. This current forest condition, reported in Table FMP-4, allowed the management unit to be placed wn a broader ecological context. The indicators provided from both series of analysis demonstrated that the Lake Nipigon Forest is arranged in a manner similar to the arrangement of larger scales in terms of overall landscape indices.

Forest Diversity Indices

The maintenance of particular landscape characteristics (e.g. amount of forest types and age classes, forest patch size and distribution, etc) increases the likelihood that biodiversity associated with the landscape will be perpetuated. Acceptable levels for this indicator, as stated in the 1996 FMPM, should be "within the bounds of natural variation". A non-spatial analysis of this indicator was completed and involved comparisons of SFMM outputs of three indices between all management alternatives to the Natural Forest scenario (the "Null Scenario"):

- The Shannon Weiner Index of Landscape Heterogeneity
- The Simpson Index of Landscape Heterogeneity
- The Shannon Index of Landscape Evenness

This analysis, presented in Section 2.3.8.2.1 of the 2001-06 FMP, illustrated that the indices did not vary a great deal (well within the +/- 20% acceptable threshold about the Null). It was concluded at that time that the Selected management Alternative was sustainable for these non-spatial indices. It is worth noting that during the preparation of the 2006-11 FMP, the value of these particular indices has become less desirable in assessing sustainability, due to their broad and non-spatial nature.

Habitat for Selected Wildlife Species

The 2006-11 FMP planning team undertook a similar analysis for this indicator as was completed for the forest diversity indices mentioned above, using SFMM. This involved an analysis of the non-spatial supply of preferred habitat for each of the selected species on the MNR Northwest Region list, over the 2001 to 2101 period. Acceptable levels for this indicator, as stated in the 1996 FMPM, should not threaten availability of preferred habitat at the eco-regional level. Unfortunately, projections of eco-regional levels into the future (at the time when the desire future forest conditions would be attained) were not available. As an alternative, acceptable (sustainable) levels for each species were set at 20% below the lowest number projected in the Null scenario during the 2001 to 2071 period. This provided an acceptable lower level that would place habitat above, or on the way to being above, the eco-regional level at which habitat would be threatened.

This indicator was measured in two ways. The first assessment was to see if the habitat trends of the Null scenario were being followed for each species. The second measure was to see if the habitat areas for each selected species kept above the mark set at 20% below the lowest value in the Null scenario. This analysis, also presented in Section 2.3.8.2.1 of the 2001-06 FMP, illustrated that preferred habitat area was closely following the habitat trends of the Null scenario for all except four of the twenty selected species. For the second measure, it was observed that wildlife habitat remained above the minimum 20% mark for all species except two. These differences in preferred area were a result of projected forest management activities and natural forest dynamics over time, and consistent with the projected changes in the forest structure, composition and condition. Considering that the differences that were revealed through this analysis were relatively minor, the planning team deemed the Selected management Alternative to be sustainable in this regard.

As an additional note, Table FMP-5 in the 2001-11 FMP, which provides a summary of preferred habitat on the management unit and its contribution to larger scales (relative to sub-regional, regional, and provincial levels), also lists changes in levels of preferred habitat since the 2001-06 FMP. Although these updated calculations were based on a new FRI, preferred habitat for species that favour older forest has generally increased since 2001 due to the ageing of the forest. In addition, preferred habitat for species that favour younger forest also increased due to the effects of harvesting. Preferred habitat for species that favour maturing forest tended to decrease somewhat, due to the effects of ageing and harvesting.

Based on this representation, it is apparent that the Lake Nipigon Forest contains a variety of habitat types for the selected wildlife species and all species remain to be reasonably well represented with respect to the sub-regional (eco-regional) numbers.

Landscape Processes

Water yield is one of the indicators of sustainability that is used to monitor forest condition, assessing the evapotranspiration and water runoff aspect of soil and water conservation. Water yield is directly affected by the amount of watershed area clearcut or burned within the past 10 years. Analysis enabled the 2006-11 FMP planning team to determine the percentage of productive forest area disturbed within the past 10 years (10.6%), in relationship to total productive forest area within second order watersheds. This measure has increased from 8.8% in 2001, due in part to forest management activities and natural disturbances, but also the new FRI with different water layers.

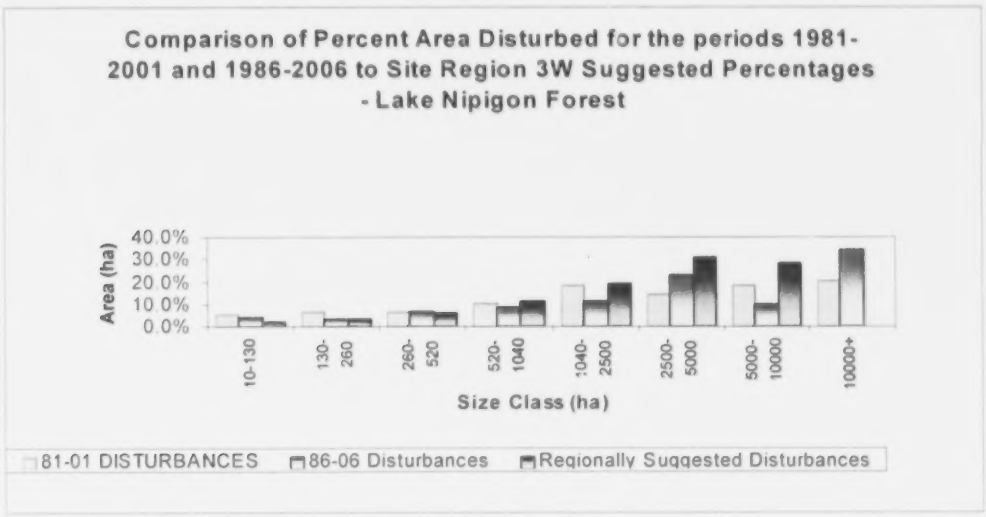
Acceptable levels for this indicator, as stated in the 1996 FMPM, should be consistent with water yield objectives for the sub-regional watershed. Objectives of this nature are not available, but as mentioned previously, the best management practices described in the *Forest Management Guidelines for the Protection of the Physical Environment* state that harvest areas within a five-year plan, plus past harvested areas not yet declared free-to-grow, should not exceed greater than 50% of a watershed area. Based on this measure, the current values for this indicator, and the amount of change over the past five years, is acceptable.

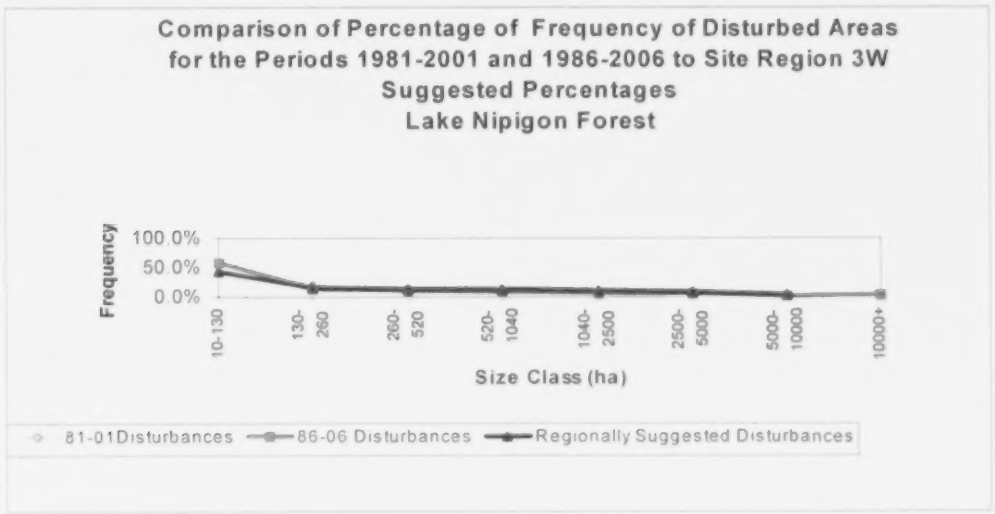
Frequency Distribution of Clearcut and Wildfire Sizes

Since depletion data for the entire 5-year term is not yet available, a definitive "before and after" assessment for this indicator of sustainability for the 2001-06 FMP is not possible at this time. However, an extensive analysis was undertaken during the preparation of the plan, with details presented in Section 2.3.9.2.1. This analysis assessed how the frequency distribution of disturbances might be affected by selected harvest areas and the passage of time (until 2006), relative to the frequency distribution in 2001 and relative to "natural" distribution. The pattern for Site Region 3W, from the *draft Forest Management Guidelines for the Emulation of Fire Disturbance Patters – Analysis Results*, was used as the "natural" distribution. Acceptable levels for this indicator, as stated in the 1996 FMPM, are achieved when the frequency distribution of clearcut and wildfire disturbance sizes show movement towards the natural distribution of disturbance frequency, by size class.

The graph presented below has been copied from the 2001-06 FMP, and shows the results of the comparison. It is evident that a very similar pattern exists in all three distributions – the Forest in 2001, the Forest in 2006 and the Site Region 3W representation. Regarding the frequency distribution in the lower chart, there are many more small disturbances with fewer large ones. And looking at the upper chart, the large disturbances occupy the majority of the disturbance area.

In viewing the proportions of area occupying each size class in the upper graph, there is movement towards the natural pattern in most size classes. Deviations (especially in the 1,040-2,500 and 5,000-10,000 size classes) were primarily the result of more disturbances shifting into the next larger size class, which in isolation was not undesired. Unfortunately, the data for wildfire disturbances in size classes greater than 10,000 hectares was not available for Site Region 3W. This limited the planning team's ability to some extent, in determining if the changes proposed were significantly different from the natural pattern. It was recognized that caribou management strategies and the recent Nipigon 12 wildfire strongly influenced the amount of larger sized disturbances (>10,000 hectares). Ultimately, it was determined that the Selected Management Alternative was acceptable, in that movement towards the natural pattern had generally been demonstrated, with the few notable exceptions being rationalized.





Conclusion

Although it is not possible at this time to undertake a complete assessment of sustainability, the available information indicates that the Lake Nipigon Forest has been managed in a sustainable fashion. During the preparation of the 2001-06 FMP, the planning team was able to demonstrate through the analysis of management alternatives and a spatial test of the selected harvest areas, that sustainability would not be compromised. There have been no significant variations from what was forecasted during the preparation of the plan. The indicators of sustainability do not demonstrate undue or extreme fluctuations.

Appendix B:
Audit Team Members and Qualifications

Audit Team Members and Qualifications

Name	Role	Responsibilities	Credentials
Mr. Herb Bax	Lead Auditor	• Overall audit coordination • Oversee activities of audit team members • Review requirements and contractual obligations • Lead review of achievement of management objectives and forest sustainability • Lead audit report preparation	R.P.F.; CF/CFA, CEA (SFM), EMS (LA); completed over 115 audits across Ontario, Canada and the United States over the past 32 years; worked on 52 IFAs and/or Forest Management Agreement reviews over the previous fifteen years; over the past eight years has participated in over 90 ISO 14001 Environmental Management System pre-assessments and registration and surveillance audits.
Mr. Laird Van Damme	Harvesting Operations Auditor	• Assess harvest planning and implementation • Review compliance program planning and implementation • Assist in assessment of achievement of management objectives and forest sustainability	R.P.F.; M.Sc.F.; adjunct professor at Lakehead University; completed 12 IFAs as silviculture/harvesting auditor and two IFAs as lead auditor; audited CFS Model Forest Program Phase 2; completed several ISO/SFI audits; author of five management plans, several book chapters, peer reviewed journal articles and numerous technical reports.
Mr. Peter Higgelke	Wildlife/Ecology Auditor	• Review and inspect AOC documentation and practices • Review and inspect aspects of forest management related to environmental practices, values and wildlife protection • Review access planning and implementation • Assist in assessment of achievement of management objectives and forest sustainability	R.P.F.; M.Sc.F.; wildlife auditor for one FMA Review and five IFAs; harvesting or silvicultural auditor for four IFAs; and planning auditor for one IFA.
Mr. Brad Chaulk	Silviculture Operations Auditor	• Review and inspect silvicultural practices and related documentation • Assist in assessment of achievement of management objectives and forest sustainability	R.P.F.; 13 years of experience in the forestry sector; head of the Technical Services Division at KBM Forestry Consultants Inc.; member of six Independent Forest Audit teams; currently the plan author for the Black Sturgeon Forest 2006 to 2026 FMP and the lead author of the Silvicultural Ground Rules for the Dog River-Matawin Forest 2005-2025 FMP.
Mr. Dave West	Forest Management Planning Auditor	• Planning requirements related to public participation and planning team activities • Review RPFO • Assist in assessment of achievement of management objectives and forest sustainability	R.P.F.; 24 years of experience with forest industry in Ontario; Fifteen years of planning experience on seven management units across Northwestern Ontario.

Name	Role	Responsibilities	Credentials
Ms. Mary Ann Seabrook	First Nations Auditor	• Consultation with local First Nations • Review First Nation consultation in forest management planning. • Review negotiations associated with T&C 77/Condition 34	Business Dipl.; of Ojibway descent and a member of the Red Rock Indian Band; a diverse social background with over 25 years experience working with various Aboriginal organizations and government; Native Auditor on four IFAs and one FSC audit.
Mr. Keith Hautala	SFMM Auditor	• Review the long-term strategic planning in the SFMM cases for the 1999-2004 FMP • Assist in assessment of achievement of management objectives and forest sustainability	M.Sc.F.; post-graduate degree studying spatial habitat modeling; analyst to planning teams within Ontario and Manitoba with respect to forest inventory analysis, aspatial and spatial forest planning, and wildlife habitat analysis; formal training in SFMM and Patchworks models; member of four IFA teams.
Ms. Terri Dawyd	Secretariat	• Review documentation and practices related to the forest management planning process and public participation • Coordinate document distribution and logistics and audit report preparation	H.B.Sc.F. (candidate); worked with MNR and contractors on various forestry projects in Northern Ontario; implemented program to increase employment opportunities for Aboriginal people in the forest sector; organized information sessions and task meetings; secretariat on two IFAs.

Appendix C:
Independent Forest Audit Guiding Principles

Independent Forest Audit Guiding Principles

1. Commitment
Commitment is reflected in vision, mission and policy statements of the company. Vision and mission statements are intended to proved long-term guidance for the organization. Policy statements reflect how the organization's vision and mission will be achieved. These statements must be reflected in the day-to-day operations of the organization.
2. Public Participation
The process of sustainable forest planning, implementation and monitoring is conducted in an open consultative fashion, with input from all members of the planning team, Local Citizens Committee, Native groups, and other parties with an interest in the operations of the forest unit.
3. Forest Management Planning
The forest management planning process involves the input of a number of individuals and groups to describe the current condition of the forest, the values and benefits to be obtained from the forest, the desired condition of the forest, and the best methods to achieve that goal. Certain minimum standards and procedures have been established upon which all management units are evaluated.
4. Plan Implementation
Verification of the actual results of operations in the field compared to the planned operations is required to be able to assess achievement of the plan objectives and compliance with laws and regulations. In conjunction with the review of operations, the reporting tables are tested to ensure accurate results are reported.
5. System Support
System support concerns resources and activities needed to support plan implementation so as to achieve the desired objectives. Appropriate control, documentation and reporting procedures must be in place and operational. Planned action should occur at planned times, in planned places and to the planned degree.
6. Monitoring
The activities and the effects of these activities in achieving management objectives must be regularly measured and assessed. In particular, the indicators of achievement must be assessed and their effectiveness reviewed.
7. Achievement of the Management Objectives and Forest Sustainability
Periodic assessments of the management of the forest unit operations and the forest unit must be made in order to determine whether forest sustainability and other management objectives are being achieved. This includes comparing the actual values of the predetermined indicator s against the planned values and assessing the reasons for any significant deviations.
8. Contractual Obligations
The licensee must comply with the specific licence requirements.

Appendix D:
List of Acronyms

List of Acronyms

AHA	Available Harvest Area
AOC	Areas of Concern
AR	Annual Report
AWS	Annual Work Schedules
B&S	Barren and Scattered
CEA	Certified Environmental Auditor
CEA(SFM)	Certified Environmental Auditor (Sustainable Forest Management)
CFSA	Crown Forest Sustainability Act
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSA	Canadian Standards Association
EA	Environmental Assessment
EMS(LA)	Environmental Management System (Lead Auditor)
FFC	Forestry Futures Committee
FIM	Forest Information Manual
FMNCP	Forest Management Native Consultation Process
FMP	Forest Management Plan
FMPM	Forest Management Planning Manual
FOIP	Forest Operations Information Program
FOIR	Forest Operation Inspection Report
FOP	Forest Operation Prescription
FRI	Forest Resource Inventory
FTG	Free-to-grow
GIS	Geographic Information System
GRZ	Ground Water Recharge Zones
HPA	High Priority Aspect
IFA	Independent Forest Audit
IFAPP	Independent Forest Audit Process and Protocol
KBM	KBM Forestry Consultants Inc.
LCC	Local Citizens Committee
MNR	Ministry of Natural Resources
MOA	Memorandum of Agreement
NDPEG	Forest Management Guide for Natural Disturbance Pattern Emulation
NRVIS	Natural Resource Values Information System
OLL	Ontario's Living Legacy Land Use Strategy
ONAS	Ontario Native Affairs Secretariat
RBT	Resource-Based Tourism
R.P.F.	Registered Professional Forester
RPFO	Report of Past Forest Operations
RSA	Resource Stewardship Agreement
SEV	Statement of Environmental Values
SFL	Sustainable Forest Licence
SFMM	Strategic Forest Management Model
SFM	Sustainable Forest Management
SGR	Silviculture Ground Rule
SMA	Selected Management Alternative
TMP	Timber Management Plan
TMPM	Timber Management Planning Manual
TREES	Timber Resources Evaluation System

Appendix E:
Summary of Input to Audit Process

Summary of Input to Audit Process

General Public/Other Stakeholders

An advertisement was placed in five local newspapers (the *Wawatay News*, the Thunder Bay *Chronicle Journal*, *Thunder Bay's Source*, the *Nipigon Red Rock Gazette, and* the *Geraldton Times Star*) providing notice of the audit and offering the public an opportunity for input to the audit process. The notice directed the public to contact the Nipigon East Area Local Citizens Committee or the Audit Secretariat with any comments regarding forest management activities on the Lake Nipigon Forest.

Public Survey

KBM prepared a one-page public survey that was distributed to all organizations and to a random sample of one-third of the individuals listed in the FMP mailing list. In total, 474 surveys were sent out. In addition, the public notice was posted on and available for download from the KBM's web site (www.kbm.on.ca). The purpose of the survey was to solicit public input and to provide respondents with an opportunity to identify and discuss any site-specific concerns on the Forest. Thirty-one responses were received and are summarized as follows:

- Eleven respondents indicated that they had contacted forest managers during the audit period regarding specific concerns and were satisfied with the response.
- Nine respondents indicated that they had never contacted forest managers during the audit period regarding any issues.
- Five respondents indicated that they had contacted forest managers during the audit period regarding specific concerns and were not satisfied with the response.
- Six respondents did not indicate whether they had contacted forest managers during the audit period regarding specific concerns.

Some of the comments provided by the respondents include:

Proposed road link to join the Lake Nipigon Forest with the Armstrong Forest

- Proposed road link should be approved to create jobs.
- More study is required on the effect the proposed road link will have on woodland caribou and fisheries.

Tourism

- Remote tourism lakes AOC well handled.
- Concern about summer operations and road access negatively affecting tourism business.
- Indicated that the tourism operation is very sensitive to forestry operations that occur within a five kilometre radius of tourism lakes from June 1 to September 30.
- Concerned that MNR does not provide adequate boat launching areas, bridges and culverts are removed and road access blocked which does not promote tourism in the area.

Utilization

- Concerns regarding wasteful practices, particularly stacked logs left to rot.
- Concerned about high grading, suggests the need for a chipping operation.
- Concerned with requirement to pay for a fuelwood licence when otherwise the wood is left to rot.

Access

- Concerned with condition of roads in the Forest, questioned whether there will be Government money available for road maintenance.
- Particularly concerned with condition of roads used to access cottages after operations occurred.
- Concerned about bridge deterioration and who is responsible for maintenance.

Regeneration

- Pleased with planting of jackpine in Wiggins Twp. west of Gravel River.
- Concerned with certain blowdown areas regenerating as shrubs.

- Believes more trees should be planted, concerned that not all areas are being planted after harvest.

Waste

- Concerned with industrial waste and garbage left on-site after operations.

General

- Species at risk, particularly caribou, lack a firm strategy and current direction is limiting.
- Increase buffers on watersheds and along major highways.
- Would like maps available prior to hunting season showing planned areas of operations so that hunt can be planned to avoid these areas.
- Concerned with water levels.
- Concerned with bears.
- Believes the Lake Nipigon Forest is well managed.

The issues brought forward by the public have been addressed, if and where applicable, throughout the report. Specific areas brought to the attention of the audit team were examined where possible (e.g. wasteful practices, regeneration, road conditions and water crossings).

First Nations

In person discussions were held with the Chief and/or representatives from Animbiigoo Zaagi'igan Anishinaabek, Biinjitiwaabik Zaaging Anishinaabek, Red Rock Indian Band, Pays Plat First Nation and Sand Point First Nation, as well as MNR and Norampac personnel. The Poplar Point Ojibway Chief could not be reached for comment. Issues brought forward by these Aboriginal communities have been addressed, where applicable, throughout the report.

Local Citizens Committee

The audit team met with the Nipigon East Area Local Citizens Committee at the LCC's regular monthly meeting while on-site for the pre-audit meeting. An LCC member also participated in one day of the field audit. The audit team also conducted personal interviews with a number of LCC members during the site visit. Issues brought forward by the LCC have been addressed, where applicable, throughout the report.

Overlapping Licensees

There are a number of Overlapping Licensees on the Lake Nipigon Forest: Domtar Inc.–White River Sawmill, Red Rock Indian Band, Biinjitiwaabik Zaaging Anishinaabek, Animbiigoo Zaagi'igan Anishinaabek and Buchanan Forest Products Ltd. Representatives of Animbiigoo Zaagi'igan Anishinaabek and one of their contractors and Buchanan Forest Products Ltd. accompanied the audit team to some of the field sites visited during audit. In person and/or telephone interviews were held with several of the licensees and the input received was incorporated into the audit report and contributed to several findings.

Commitment Holders

A questionnaire was distributed to commitment holders on the Lake Nipigon Forest to solicit input and to provide each respondent with an opportunity to identify and discuss any site-specific concerns. Considerable discussions were held with SFL Appendix E commitment holders before, during and after the audit site visit. The issues and concerns raised have been addressed, where applicable, in the report. Similar to above, the audit team met with several of the commitment holders and their input was considered and affected some of the audit findings.

SFL Holder

Norampac and Domtar staff provided significant input into the audit. Methods of input included providing background documentation such as the forest management plans, the Trend Analysis Report, maps, and the guiding of field inspections. The audit team recognizes and appreciates that the staff made great

efforts to assemble the field binders and organize many aspects of the audit. Numerous interviews were supported with extensive discussion in the field with Norampac and Domtar staff. These discussions formed a significant basis for understanding forest management on the Lake Nipigon Forest.

Ministry of Natural Resources

Ministry of Natural Resources staff provided significant input into the audit through interviews and the preparation of documentation. Representatives from the Nipigon District office were present at the pre-audit meeting, the opening and closing meetings, as well as the field site visits. Interviews were conducted with the District Manager, Area Supervisor, Area Forester, Area Biologist, Area Technicians, GIS staff and Area Clerk. An MNR Regional representative also participated in the closing meeting.

The excellent support of the audit process by staff of both Norampac and MNR Nipigon District was noted by the audit team.

Appendix F:
Public Survey

Public Survey

KBM FORESTRY CONSULTANTS INC.
2006 INDEPENDENT FOREST AUDIT
PUBLIC SURVEY

Every five years, as part of the Province's responsibility for resource management in Ontario, the Ministry of Natural Resources (MNR) contracts firms to evaluate forest management activities on Crown lands. KBM Forestry Consultants Inc. of Thunder Bay, Ontario has been engaged by the MNR this year to conduct an independent forest audit of the Lake Nipigon Forest for the period 2001-2006.

As part of our evaluation, we would appreciate your input as a member of the public with an interest in forest management on the Lake Nipigon Forest. If you have comments related to forestry activities during the five-year period April 1, 2001 to March 31, 2006, please complete and submit this form (please see back of sheet for more information on the audit process).

KBM provides this opportunity to comment on the Lake Nipigon Forest audit, under the authority of Ontario Regulation 160/04 made under the Crown Forest Sustainability Act, 1994. Any personal information provided will be used solely by the audit team as input to the Lake Nipigon Forest Independent Forest Audit. Any questions regarding the collection, use, and retention of the personal information can be directed to Herb Bax, Lead Auditor at 807-345-5445 ext. 230 (email: hbax@kbm.on.ca) or to the company address indicated below.

Name (optional)

Tel. and/or email (optional)

1. What is your interest in forest management on the Lake Nipigon Forest?

Recreation ☐
Employment (forestry, tourism, etc.) ☐
Conservation ☐
Other

2. Can you identify any specific locations or activities on the Lake Nipigon Forest that illustrate good OR poor management practices, and that the audit team should be aware of in conducting their evaluation? Please provide details.

3. Have you ever contacted forest managers with comments or concerns during the 2001-2006 audit period? *(e.g., local Ministry of Natural Resources, Domtar Inc.)* ☐**Yes** ☐**No**

4. If yes, were you satisfied with the response? ☐**Yes** ☐**No**

5. Feel free to add any additional comments (use additional sheet if required)

6. Please indicate if we may contact you for more information. ☐**Yes** ☐**No**
(If Yes, ensure that you have provided your contact information above.)

Please **mail, email, or fax** the completed survey (Attention: Terri Dawyd) to the address/fax number below by **Friday June 9, 2006**

The survey can also be accessed through our website, located at www.kbm.on.ca

Although we cannot respond to everyone, we do take into consideration all comments received.
THANK YOU IN ADVANCE FOR YOUR INPUT.

KBM Forestry Consultants Inc.
tdawyd@kbm.on.ca
349 Mooney Avenue
Thunder Bay, ON P7B 5L5
http://www.kbm.on.ca
Tel. (807) 345-5445 ext. 233
Fax. (807) 345-5858

INDEPENDENT FOREST AUDIT

Lake Nipigon Forest

KBM Forestry Consultants Inc. has been retained by the Ministry of Natural Resources (MNR) to conduct an Independent Forest Audit, consistent with the Crown Forestry Sustainability Act, on the management of the Lake Nipigon Forest.

The audit covers the April 1, 2001 to March 31, 2006 operating period. You are invited to comment on the forest management activities on the Lake Nipigon Forest for this period of time. Please mail, email, or fax this form to:

Ms. Terri Dawyd
KBM Forestry Consultants Inc.
349 Mooney Ave., Thunder Bay, ON P7B 5L5
tdawyd@kbm.on.ca
Tel: (807) 345-5445 ext. 233
Fax: (807) 345-5858
Toll-Free: 1-800-465-3001

Alternatively, comments can be made directly to the Local Citizens' Committee Chairperson:

Ms. Betty Jean Brill, Chair
Nipigon East Area Local Citizens' Committee
RR #1, Nipigon, ON P0T 2J0
ravenart2003@yahoo.com
Tel: (807) 887-2617

Comments must be received by
Friday, June 2, 2006.

Purpose of the Independent Forest Audit

The Purpose of the audit is to assess:

- compliance with the *Crown Forest Sustainability Act*.
- compliance with the Forest Management Planning Process.
- a comparison of planned versus actual forest management activities.
- the effectiveness of forest management activities in achieving audit criteria and management objectives.
- assess the effectiveness of previous audit action plans, and
- where applicable, a licensee's compliance with the terms and conditions of the Sustainable Forest Licence.

The eight-member audit team will evaluate forest management planning and practices such as harvest operations, forest renewal activities, road construction and maintenance as well as opportunities for public input and First Nations consultation. The main objectives of the audit are to assess compliance with provincial laws and regulations as well as comment on the effectiveness and sustainability of forestry activities on the management unit.

In addition, the independent forest audit provides an opportunity to improve Crown land management in Ontario through adaptive management. The audits are conducted by consultants that are independent of the Ministry of Natural Resources and the companies being audited, and firms are selected in an arms-length process by the Forestry Futures Committee of Ontario.

INDEPENDENT FOREST AUDIT

Lake Nipigon Forest

KBM Forestry Consultants Inc. has been retained by the Ministry of Natural Resources (MNR) to conduct an Independent Forest Audit, consistent with the Crown Forestry Sustainability Act, on the management of the Lake Nipigon Forest.

The audit covers the April 1, 2001 to March 31, 2006 operating period. You are invited to comment on the forest management activities on the Lake Nipigon Forest for this period of time. Please mail, email, or fax this form to:

Ms. Terri Dawyd
KBM Forestry Consultants Inc.
349 Mooney Ave., Thunder Bay, ON P7B 5L5
tdawyd@kbm.on.ca
Tel: (807) 345-5445 ext. 233
Fax: (807) 345-5858
Toll-Free: 1-800-465-3001

(All correspondence sent to KBM is confidential)

Alternatively, comments can be made directly to the Local Citizens' Committee Chairperson:

Ms. Betty Jean Brill, Chair
Nipigon East Area Local Citizens' Committee
RR #1, Nipigon, ON P0T 2J0
ravenart2003@yahoo.com
Tel: (807) 887-2617

(The privacy of any information given to the LCC may not necessarily be protected)

Comments must be received by
Friday, June 2, 2006.

Purpose of the Independent Forest Audit

The Purpose of the audit is to assess:

- compliance with the *Crown Forest Sustainability Act*,
- compliance with the Forest Management Planning Process,
- a comparison of planned versus actual forest management activities,
- the effectiveness of forest management activities in achieving audit criteria and management objectives,
- assess the effectiveness of previous audit action plans, and
- where applicable, a licensee's compliance with the terms and conditions of the Sustainable Forest Licence.

The eight-member audit team will evaluate forest management planning and practices such as harvest operations, forest renewal activities, road construction and maintenance as well as opportunities for public input and First Nations consultation. The main objectives of the audit are to assess compliance with provincial laws and regulations as well as comment on the effectiveness and sustainability of forestry activities on the management unit.

In addition, the independent forest audit provides an opportunity to improve Crown land management in Ontario through adaptive management. The audits are conducted by consultants that are independent of the Ministry of Natural Resources and the companies being audited, and firms are selected in an arms-length process by the Forestry Futures Committee of Ontario.

Appendix G:
Public Notification

Public Notification

ARMSTRONG FOREST ~ LAKE NIPIGON FOREST
INDEPENDENT FOREST AUDITS

KBM Forestry Consultants Inc. of Thunder Bay, Ontario has been retained by the Ontario Ministry of Natural Resources to conduct an Independent Forest Audit, consistent with the Crown Forest Sustainability Act, on the management of the Armstrong Forest & the Lake Nipigon Forest. The purpose of the audit is to assess forest management activities within the Armstrong & Lake Nipigon Forests during the five-year audit period from April 1, 2001 to March 31, 2006. Specifically:

- compliance with the Crown Forest Sustainability Act;
- compliance with the Forest Management Planning process;
- a comparison of planned versus actual forest management activities;
- the effectiveness of forest management activities;
- the effectiveness of previous audit action plans; &
- compliance with the terms and conditions of the Sustainable Forest Licence.

You are invited to comment on forest operations on the Forests for this period of time. Please provide your comments by FRIDAY, JUNE 2, 2006, directly to the relevant Local Citizens Committee:

Armstrong Forest LCC
Diane Laybourne, Chair
P.O. Box 24
Armstrong, ON P0T 1A0
Tel: (807) 583-2080
Email: aardc@tbaytel.net

Nipigon Area East LCC
Betty Jean Brill, Chair
RR #1
Nipigon, ON P0T 2J0
Tel: (807) 887-2617
Email: ravenart2003@yahoo.com

The privacy of information given to the LCC may not necessarily be protected.

Alternatively, comments can be sent directly to:

Ms. Terri Dawyd
KBM Forestry Consultants Inc.
349 Mooney Avenue
Thunder Bay, ON P7B 5L5
Tel: 807-345-5445 ext. 233
Fax: 807-345-5858
Toll Free: 1-800-465-3001
Email: tdawyd@kbm.on.ca

All correspondence sent to KBM is strictly confidential.

For more information or to download and complete our public audit survey, please visit: www.kbm.on.ca